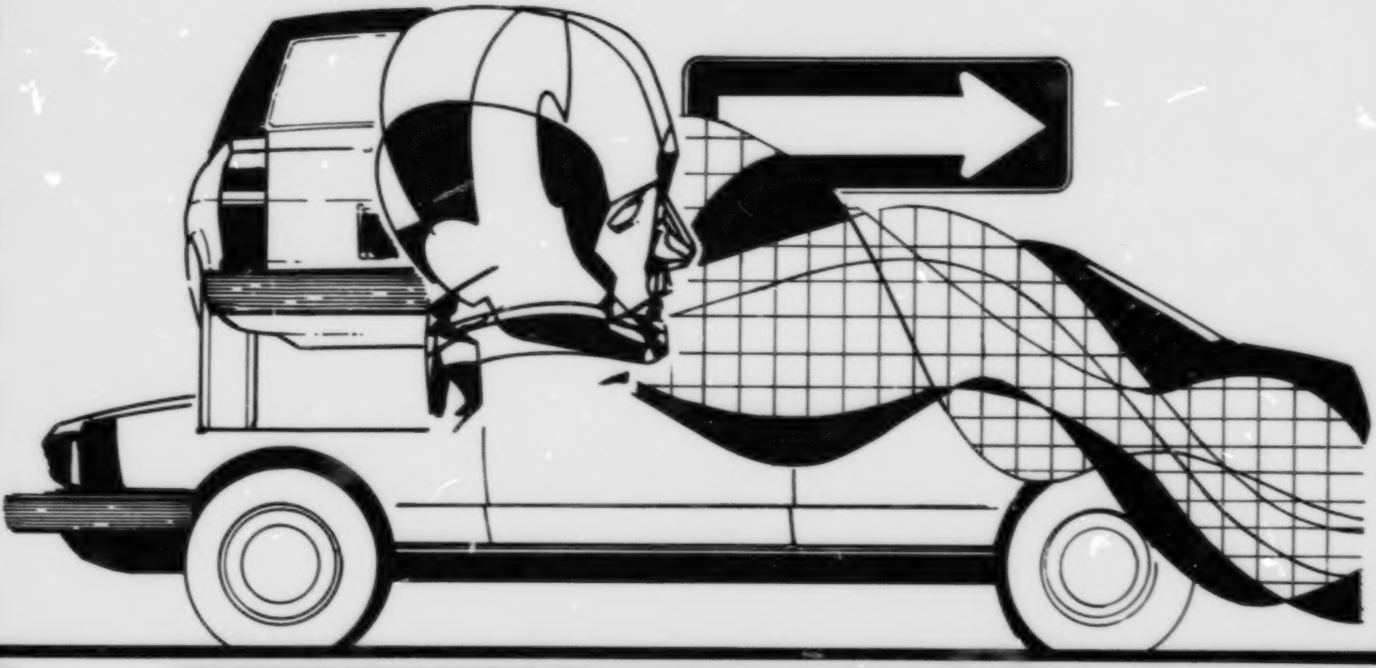
PROCEEDINGS
PUBLIC FORUM ON OCCUPANT RESTRAINTS

DELIBERATIONS
COLLOQUE PUBLIC SUR LES ENSEMBLES DE RETENUE DES OCCUPANTS

OTTAWA, MARCH 25-26 1987

OTTAWA, 25-26 MARS 1987



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Transport Canada **Transports Canada**

Road Safety **Securité routière**

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PUBLIC FORUM ON OCCUPANT RESTRAINTS
OTTAWA, ONTARIO
MARCH 25-26, 1987

AGENDA

MARCH 25, 1987

Session 1 (1:30 - 5:00 p.m.)

Welcome to Participants:
- Chairman, Dr. Gordon Campbell, Director General, Road Safety

Remarks:
- David Kilgour, Parliamentary Secretary of Minister of Transport

Introduction:
- Dr. Gordon Campbell

Description of Occupant Restraint Systems:

i) Manual Seat Belts and Child Restraints
  - Ms. France Legault, Standards & Regulations Division, Road Safety

ii) Automatic Systems (NO WRITTEN PRESENTATION AVAILABLE)
  - Messrs. Ron Bright & Bill Bohan, Ford Motor Company

Consumer Acceptance of Restraint Systems:
- Dr. Brian Jonah, Chief, Road Users Division, Road Safety

Injury Reduction Potential:
- Mr. Dainius Dalmotas, Vehicle Systems Division, Road Safety

Effectiveness of Policy Options:
- Mr. John Lawson, Chief, Evaluation Division, Road Safety

Costs of Various Systems:
- Mr. Ralph Hitchcock, National Highway Traffic Safety Administration, U.S. Department of Transportation

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MARCH 26, 1987

Session 2 (9:00 a.m. - 12:00 p.m.)

Presentation of Briefs:

Canada Safety Council
- Mr. R. McLean

University of Western Ontario
- Prof. E. Nowak, Dr. R. Green

Automobile Importers of Canada
- Mr. P. Dawes

The National Child Safety Committee
- Mrs. J. Solomon

McGill University
- Prof. A. Thompson & Mrs. D. Steiner

Mercedes-Benz
- Mr. G. Hespeler

Nova Scotia Highway Safety Council
- Dr. C. Miller

Motor Vehicle Manufacturers Association
- Mr. M. Nantais

University of Montreal
- Dr. C. Laberge-Nadeau

Insurance Corporation of British Columbia
- Mr. J. Gane

Canadian Automobile Association, Quebec
- Mme. J. Abgral

Montreal Children's Hospital
- Dr. B. Pless

Session 3 (1:30 - 5:00 p.m.)

Open discussion of issues related to motor vehicle occupant protection by all participants, summary of major points raised, and adjournment.

COLLOQUE PUBLIC SUR LES ENSEMBLES DE RETENUE DES OCCUPANTS

OTTAWA (ONTARIO)

25 ET 26 MARS 1987

PROGRAMME

25 MARS 1987

1re séance (13 h 30 à 17 h)

Message de bienvenue:
- Le Président, M. Gordon Campbell, directeur général de la Sécurité routière

Allocution:
- M. David Kilgour, secrétaire parlementaire du ministre des Transports

Mot de présentation:
- M. Gordon Campbell

Description des ensembles de retenue des occupants:

i) Ceintures de sécurité manuelles et ensembles de retenue d'enfants
  - Mme France Legault, Division des normes et des règlements, Sécurité routière

ii) Dispositifs automatiques (IL N'Y A PAS D'EXPOSE ECRIT)
  - MM. Ron Bright et Bill Bohan, société Ford

Acceptation des ensembles de retenue par le consommateur:
- M. Brian Jonah, chef de la Division des usagers de la route, Sécurité routière

Possibilités de réduction des lésions:
- M. Dainius Dalmotas, Division des systèmes des véhicules, Sécurité routière

Efficacité des diverses politiques possibles:
- M. John Lawson, chef de la Division de l'évaluation, Sécurité routière

Coûts des divers dispositifs:
- M. Ralph Hitchcock, National Highway Traffic Safety Administration, secrétariat des Transports des É.-U.

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26 MARS 1987

2e séance (9 h à 12 h)

Présentation des mémoires:

Conseil canadien de la sécurité
- M. R. McLean

Université Western Ontario
- Le professeur E. Nowak et Dr R. Green

Automobile Importers of Canada
- M. P. Dawes

The National Child Safety Committee
- Mme J. Solomon

Université McGill
- Le professeur A. Thompson et Mme D. Steiner

Mercedes-Benz
- M. G. Hespeler

Nova Scotia Highway Safety Council
- M. C. Miller

La Société des fabricants de véhicules à moteur
- M. M. Nantais

Université de Montréal
- Dr C. Laberge-Nadeau

Insurance Corporation of British Columbia
- M. J. Gane

Association canadienne des automobilistes, Québec
- Mme J. Abgral

Hôpital de Montréal pour enfants
- Dr B. Pless

3e séance (13 h 30 à 17 h)

Débat ouvert à tous les participants sur les questions afférentes à la protection des occupants des véhicules automobiles, résumé des grands points soulevés et clôture.

PUBLIC FORUM ON PASSENGER CAR OCCUPANT RESTRAINTS/

COLLOQUE PUBLIC SUR LES ENSEMBLES DE RETENUE DES OCCUPANTS

MARCH 25-26, 1987 / 25-26 MARS 1987

PARTICIPANTS

Richard Godding, Director
Technology and Travel Service
Canadian Automobile Association
1775 Courtwood Crescent
OTTAWA, Ontario
K2C 3J2

M. Ivan Lajoie
Politique et Programmes
Régie de l'assurance automobile
  du Québec
5e étage
1134, chemin St-Louis
SILLERY (Québec)
G1S 1E5

Mr. R. H. Karbowski
Safety Engineering
Ford Motor Co.
P.O. Box 2053
DEARBORN, Michigan
U.S.A. 48121

Professor A. Lloyd Thompson
Department of Mechanical Engineering
McGill University
550 Sherbrooke Street West
Room 1605
MONTREAL, Quebec
H3A 1B9

Mrs. Diana Steiner
McGill University
550 Sherbrooke Street West
Room 1605
MONTREAL, Quebec
H3A 1B9

Brian Gallup
Biokinetics & Associates Ltd.
1481 Cyrville Road
OTTAWA, Ontario
K1B 3L7

Ms. Catherine McClymont
Mechanical and Electrical
Hazards Division
Product Safety Branch
Consumer & Corporate Affairs
Place du Portage 1
HULL, Quebec
K1A 0C9

Mr. William Scully
Manager, Safety Engineering
BMW of North America, Inc.
BMW Plaza
MONTVALE, New Jersey
U.S.A. 07645

Mr. Donald F. Mason
Faculty of Engineering
University of New Brunswick
FREDERICTON, N.B.
E3B 5A3

Dr. A. Chapdelaine
Hôpital de l'Enfant-Jésus
Direction de la Santé Communautaire
Pavillon Notre-Dame
1401 - 18ième Rue
Québec (Québec)
G1J 1Z4

Dr. James A. Newman
Biokinetics & Associates Ltd.
1481 Cyrville Road
OTTAWA, Ontario
K1B 3L7

Mr. Maurice Gingues
Office of Thérèse Killens, M.P.
Room 419
Confederation Building
OTTAWA, Ontario
K1A 0A6

Mr. Don Smith
W1310/CKBY Radio
112 Kent Street
OTTAWA, Ontario

Mr. Tomoyo Hayashi
Nissan Research & Development
3995 Research Park Drive
ANN ARBOR, Michigan
U.S.A. 48108

Mr. Sadato Kadoya
Manager
Safety Engineering Dept.
Mazda (North America)
1203 Woodridge Ave.
ANN ARBOR, Michigan
U.S.A. 48105

Mr. Jeffrey Dowell, Manager
Vehicle Regulatory Affairs
American Motors (Canad) Inc.
350 Kennedy Road South
BRAMPTON, Ontario
L6V 2M3

Mr. G.M. Hespeler
Safety Engineering Manager
Mercedes-Benz of North America Inc.
One Mercedes Drive
MONTVALE, N.J.
U.S.A. 07645

Mr. Ralph Hitchcock
U.S. Department of Transportation
National Highway Traffic Safety
Administration
400 Seventh St., S.W.
WASHINGTON, D.C.

Mr. Stephen F. Andrunyk
President and General Manager
Ontario Safety League
82 Peter Street
3rd Floor
TORONTO, Ontario
M5V 2G5

M. Yves Lebrasseur
Project Venus
Bombardier Ltée.
VALCOURT, Québec
J0E 2L0

Mr. Charles A. Preuss
Volkswagen of America
c/o Mrs. I. Nonnenkamp
Volkswagen Canada Inc.
1940 Eglinton East
SCARBOROUGH, Ontario
M1L 2M2

Mrs. Maureen Hilditch
Information Officer
Public Affairs Office
Transport Canada
Manitoba Region
333 Main Street
P.O. Box 8550
WINNIPEG, Manitoba
R3C 0P6

Dr. F.R. Wilson
Faculty of Engineering
University of New Brunswick
FREDERICTON, N.B.
E3B 5A3

Mr. Eric Hildebrand
Faculty of Engineering
University of New Brunswick
FREDERICTON, N.B.
E3B 5A3

Mr. C.H. Witney
Canadian School Trustees Assoc.
1140 Morrison Drive
Suite 220
OTTAWA, Ontario
K2H 8S9

Dr. Claire Laberge-Nadeau
Professeur Agréé
Université de Montréal
Département Médecine Sociale
et Préventive
C.P. 6128, Succ. A
MONTREAL (Québec)
H3C 3J7

Mr. Takashi Yoshie
Assistant Manager
Regulatory Liaison
Toyota Motor Corp.
919 - 18th St. N.W.
WASHINGTON, D.C.

Mr. Randy McLean
Manager, Traffic Section
Canada Safety Council
1765 St. Laurent Blvd.
OTTAWA, Ontario
K1G 3V4

Brenda Sanfaçon
Public Affairs
CAA Québec
2600 boul. Laurier
C.P. 9600
STE-FOY (Québec)
G1V 4K8

Jacqueline Abgral
Directrice adjointe
Service de l'éducation routière
CAA Québec
2600 boul. Laurier
C.P. 9600
STE-FOY (Québec)
G1V 4K8

M. Yvon Lapointe
Directeur
Service de l'éducation routière
2860, Quatre-Bourgeois
Suite 200
STE-FOY (Québec)

Mr. Jean Ryan
Insurance Bureau of Canada
181 University Avenue
13th Floor
TORONTO, Ontario
M4C 1J9

Mr. Norm Wasylyk
Inspector
Traffic and Marine Branch
Ontario Provincial Police
90 Harbour Street
TORONTO, Ontario
M7A 2S1

Mr. Richard Garlick
Director, Communications
Consumers Association of Canada
2660 Southvale Cres. - Level 3
OTTAWA, Ontario
K1B 5C4

Mr. Kalle Vaga,
Head, Safety Policy
Ministry of Transportation and
Communications
1201 Wilson Avenue
West Building, Room 201
DOWNSVIEW, Ontario
M3M 1J8

Ms. Barbara Bisgrove
Safety Policy Officer
Ministry of Transportation and
Communications
1201 Wilson Avenue
West Building, Room 201
DOWNSVIEW, Ontario
M3M 1J8

Mr. John Hughes
Manager, Safety Coordination and
Development Office
Ministry of Transportation and
Communications
1201 Wilson Avenue
West Building, Room 201
DOWNSVIEW, Ontario
M3M 1J8

Mr. George Iny
Counsellor
Automobile Protection Association
292 St. Joseph Blvd. West
MONTREAL, Québec
H2V 2N7

Mr. Peter J. Dawes
Automobile Importers of Canada
World Trade Centre
60 Harbour Street
TORONTO, Ontario
M5J 1B6

Mr. Neil Tremblay
Canadian Medical Association
1867 Alta Vista Drive
OTTAWA, Ontario
K1G 0G8

M. Robert Fleury
Journal Le Soleil
390 St. Vallier Est
Québec (Québec)
G1K 7J6

Mrs. Joyce L. Solomon
National Child Safety Committee
Consumers' Association of Canada
Box 9300
OTTAWA, Ontario
K1G 3T9

Dr. Robert N. Green
Senior Research Associate
University of Western Ontario
Accident Research Team
Engineering Science, Rm 2050A
LONDON, Ontario
N6A 5B9

Mr. Eugene Ambroso
Environmental Activities Staff
Automotive Safety
GM Technical Centre
30001 Vandyke Ave.,
WARREN, Michigan
48090

Thérèse Killens, M.P.
Saint-Michel Ahuntsic
Room 419
Confederation Building
OTTAWA, Ontario
K1A 0A6

Mr. R.M. Bright
Director, Environmental Control
and Vehicle Safety
Ford Motor Co. of Canada
The Canadian Road
OAKVILLE, Ontario
L6J 5E4

Mr. William J. Bohan, Manager
Occupant Protection Systems
Ford Motor Company
The American Road
P.O. Box 1899
DEARBORN, Michigan
U.S.A. 48121

Mr. J.E. Elliott
Chrysler Canada Ltd.
Chrysler Centre
WINDSOR, Ontario
N9A 4H6

Mr. Clinton E. Spevak
Specialist
Passive Restraint Systems
Chrysler Corporation
P.O. Box 1118
DETROIT, Michigan
U.S.A. 48288

Mr. L.L. Smith
Chrysler Corporation
P.O. Box 1118
DETROIT, Michigan
U.S.A. 48288

Mr. Mark Nantais
Motor Vehicle Manufacturers' Association
25 Adelaide Street, East
TORONTO, Ontario
M5C 1Y7

Mr. Norm Thurston
Dealer Support Manager
Hyundai Auto Canada Inc.
30 East Pearce Street
RICHMOND HILL, Ontario
L4B 1B7

Mr. David Kilgour
Parliamentary Sectretary
Minister of Transport

Mr. David Steventon
Canadian Automobile Association
1775 Courtwood Crescent
OTTAWA, Ontario
K2C 3J2

Mr. Manfred Mokry
National Service Manager
Mercedes-Benz Canada Inc.
849 Eglinton Avenue East
TORONTO, Ontario
M4G 2L5

Prof. E. Nowak
Accident Research Team
University of Western Ontario
LONDON, Ontario
N6A 5B9

Mr. A. Miklosik
Vehicle Safety Engineer
General Motors of Canada Ltd.
Engineering Department 098-001
OSHAWA, Ontario
L1G 1K7

Ms. Sharon MacDonald
Research Officer
C.C.M.T.A.
1765 St. Laurent Blvd.
OTTAWA, Ontario
K1G 3V4

Dr. Charles Miller
Vehicle Safety Research Team
Technical University of Nova Scotia
P.O. Box 1000
HALIFAX, Nova Scotia
B3J 2X4

Ms. Shirley Post
Canadian Institute of Child Health
Suite 105
17 York Street
OTTAWA, Ontario
K1N 5S7

Mr. John Gane
Manager,
Material Damage Review
Insurance Corporation of B.C.
151 West Esplanade
NORTH VANCOUVER, B.C.
V7M 3H9

Mr. R.W. Baker
Engineering Department
General Motors of Canada Ltd.
OSHAWA, Ontario
L1G 1K7

Mr. Dan Mayhew
Traffic Injury Research Foundation
171 Nepean Ave.
OTTAWA, Ontario
K2P 0B4

TRANSPORT CANADA

John Lawson
Transport Canada

Eton Lawrence
Transport Canada

Ms. Lori Ann French
Transport Canada (Airports)

Barry Kershaw
Transport Canada

Jim Bain
Transport Canada

Robin V. Myers
Transport Canada

R. Heggart
Transport Canada

France Legault
Transport Canada

Dainius Dalmotas
Transport Canada

Brian Jonah
Transport Canada

Grant Smith
Transport Canada

Bill Gardner
Transport Canada

Bob Clark
Transport Canada

S.C. Wilson
Transport Canada

Jerry Farr
Transport Canada

Gordon Campbell
Transport Canada

Brian Grant
Transport Canada

- - - - - - - - - - - - - -

Mr. A.J. Popoff
Director
Traffic Safety Engineering
Saskatchewan Highways and
Transportation
London Life Place
1855 Victoria Avenue
REGINA, Saskatchewan
S4P 3V5

(did not attend forum -
requested copy of proceedings)

Ms. Phyllis Colvin
Policy, Communications and
Information Division
Health & Welfare Canada
Room 1466
Brooke Claxton Bldg.
Tunney's Pasture
OTTAWA, Ontario
K1A 0K9

(did not attend forum -
requested copy of proceedings)

TRANSPORT CANADA PUBLIC FORUM ON OCCUPANT RESTRAINTS

SUMMARY OF PROCEEDINGS

March 25-26, 1987

Session 1

The forum was opened by the Chairman, Dr. Gordon D. Campbell, Director General, Road Safety and Motor Vehicle Regulation, Transport Canada.

Dr. Campbell described the background to the forum. He referred to the announcement, attached as Annex I, by the Minister of Transport that Transport Canada had completed a review of its policy on occupant restraints and that a discussion paper on the subject had been released. The Minister had also announced that, in view of the level of public interest in the topic, a public forum would be held to obtain the views of interested individuals and groups on the proposed policy. Dr. Campbell noted that copies of the discussion paper had been distributed to participants in the forum. He encouraged all present to contribute to the discussion, emphasizing that Transport Canada had organized the forum to hear the views of participants. Dr. Campbell then introduced Mr. David Kilgour, M.P., Parliamentary Secretary to the Minister of Transport.

Mr. Kilgour made a few remarks expressing his personal concern for road safety and his particular interest in the safety of child occupants. He announced that, during the next six months, Transport Canada was inviting

TRANSPORTS CANADA DÉBAT PUBLIC SUR LES ENSEMBLES DE RETENUE DES OCCUPANTS DE VÉHICULES AUTOMOBILES

RÉSUMÉ DES DÉLIBÉRATIONS

Les 25 et 26 mars 1987

Séance 1

La séance est ouverte par le Président, Dr Gordon D. Campbell, Directeur général, Sécurité routière et réglementation automobile, Transports Canada.

Dr Campbell fournit des renseignements de base aux participants. Il fait référence à l'annonce par le ministre des Transports, qui figure à l'annexe I, selon laquelle Transports Canada a terminé l'examen de sa politique sur les ensembles de retenue des occupants de véhicules automobiles, et qu'il a rendu public un document de travail sur la question. Il déclare que le Ministre a également annoncé qu'étant donné le vif intérêt manifesté par le public, un débat public aurait lieu pour connaître les vues des personnes et des groupements intéressés sur la politique proposée. Il fait remarquer que des exemplaires du document de travail ont été distribués aux participants. Il encourage tous ces derniers à intervenir dans le débat, en soulignant que Transports Canada a organisé celui-ci pour connaître le point de vue de tous et chacun d'entre eux. Il présente ensuite M. David Kilgour, député, secrétaire parlementaire du ministre des Transports.

M. Kilgour fait quelques observations indiquant que la sécurité routière lui tient à coeur et qu'il se préoccupe notamment de la sécurité des enfants qui se déplacent en automobile. Il annonce qu'au cours des prochains six

written comments from the public on the question of occupant restraint standards for the rear seating positions in passenger vehicles. A copy of Mr. Kilgour's presentation is contained in Annex II.

The session continued with the six remaining presentations by representatives of Transport Canada, Ford Motor Company and the U.S. National Highway Traffic Safety Administration (NHTSA), which are included in Annex II. During a break, a demonstration simulating an air cushion activation was given by Ford representatives. Forum participants also had an opportunity to examine the motorized automatic two-point seat belt system installed in the U.S. model of the Ford Escort.

Following the formal presentations, the speakers answered questions from the floor on a range of topics. On the subject of the costs of air cushion restraints systems (ACRS), Mr. Hitchcock of NHTSA made clear that his estimates were based on production volumes of at least 100,000 units. He felt that further economies of scale were unlikely to be significant for volumes in excess of 200,000 units. Technological development appeared to be a more probable source of cost reductions. Mr. Bohan of Ford was more optimistic about the possible reduction of unit costs with increasing volume, but agreed that unit costs would not decrease indefinitely. The negative effect of federal and provincial sales taxes on ACRS costs in Canada were noted by Mr. Elliott of Chrysler Canada.

mois, Transports Canada invitera le public à lui transmettre ses commentaires sur la question des normes régissant les ensembles de retenue des occupants de la banquette arrière des voitures de tourisme. On trouvera à l'annexe II une copie de l'exposé de M. Kilgour.

La séance se poursuit avec les six dernières communications faites par des représentants de Transports Canada, de la société Ford et de l'Administration nationale de la sécurité routière des États-Unis, qui figurent à l'annexe II. Au cours d'une pause, les représentants de la société Ford font une démonstration simulant le déploiement d'un coussin autogonflable. Les participants au débat ont également l'occasion d'examiner la ceinture de sécurité automatique et motorisée, installée dans le modèle américain de la Ford Escort.

Après leurs exposés officiels, les intervenants répondent aux questions des participants sur divers sujets. En ce qui concerne le coût des coussins autogonflables en tant que dispositifs de retenue (protection pneumatique (PP)), M. Hitchcock, de la NHTSA, indique clairement que ses estimations sont fondées sur un volume de production d'au moins 100 000 exemplaires. Il estime qu'il est peu probable que d'autres économies d'échelle soient importantes dans le cas d'un volume dépassant 200 000 exemplaires. Le progrès technique lui paraît être une cause plus probable de réduction des frais. M. Bohan, de la société Ford, se montre plus optimiste au sujet des chances de réduction du prix unitaire grâce à l'augmentation du volume de la production, mais convient que ce prix ne diminuera pas indéfiniment. Les effets défavorables des taxes de vente fédérale et provinciales sur le prix de la

With reference to all-mechanical air bag systems, such as that developed by the Breed Corporation, Mr. Hitchcock estimated that unit costs for production volumes might be about U.S. $150, compared with about $250 for equivalent electro-mechanical systems. No effectiveness data were available, but he expected the all-mechanical systems to be about as effective as the conventional systems. Mr. Bohan commented that Ford had studied a mechanical air bag system and was concerned about its level of reliability in deployment when manufactured in volume.

Other subjects raised in questions included the effectiveness of seat belts for rear seat occupants. Mr. Dalmotas of Transport Canada confirmed that his analyses of data from Alberta and Ontario implied very high levels of effectiveness for the lap belt in reducing the risk of fatal injury to older children. As an illustration of this fact, he observed that, since 1976, the absolute numbers of children in the 5 to 14 age group killed annually in the rear seats of passenger cars in Ontario had decreased by some 60 percent, while the exposed population had decreased by perhaps 10 percent as a result of demographic factors.

There was consensus that the voluntary installation by the vehicle manufacturers of three-point belts in the rear

protection pneumatique au Canada sont signalés par M. Elliott, de Chrysler Canada.

En faisant référence aux coussins autogonflables entièrement mécaniques, comme celui qui a été mis au point par la société Breed, M. Hitchcock estime que le prix unitaire pourrait être d'environ 150 $ américain, comparativement à environ 250 $ pour les coussins pneumatiques électro-mécaniques. Il n'y a aucune donnée d'efficacité, mais il s'attend à ce que les coussins autogonflables entièrement mécaniques soient à peu près aussi efficaces que leurs équivalents classiques. M. Bohan fait observer que la société Ford a envisagé un coussin autogonflable mécanique, et qu'elle est préoccupée par la fiabilité de celui-ci en matière de déploiement, lorsqu'il est fabriqué en grand nombre.

D'autres questions soulevées par les participants comprennent notamment l'efficacité des ceintures de sécurité pour les occupants de la banquette arrière. M. Dalmotas, de Transports Canada, confirme que ses analyses des données de l'Alberta et de l'Ontario lui ont fait entrevoir la très grande efficacité de la ceinture sous-abdominale en matière de réduction du risque de blessures mortelles que courent les enfants plus âgés. Pour expliciter sa pensée, il fait observer que depuis 1976, le nombre absolu d'enfants de 5 à 14 ans tués chaque année sur la banquette arrière des voitures de tourisme, en Ontario, a diminué de quelque 60 pour cent, alors que la population exposée au risque de morts ou de blessures a peut-être chuté de 10 pour cent à cause de facteurs démographiques.

On est d'accord que l'installation facultative de ceintures trois points sur la banquette arrière, par les seats was a move in the right direction. However, the effectiveness of such installations would not be known until considerable field experience had been accumulated. It was possible that the major benefit of such systems might be in increasing seat belt use in the rear by facilitating enforcement of seat belt use laws. As far as children were concerned, Ms. Legault of Transport Canada suggested that the three-point belt restraint would not necessarily offer any advantage over a lap belt and booster cushion because of the possibly poor fit of the upper torso belt on the child.

Session 2

In this second session of the forum, ten prepared briefs were presented on behalf of individuals or organizations. Those briefs are included in Annex III to the present document. Substantive issues arising during the discussion of those briefs are summarized below.

There was strong support from the representatives of the Canada Safety Council, the Consumers' Association of Canada, and the Motor Vehicle Manufacturers Association for a national public education and enforcement program to improve seat belt wearing rates and proper use of child seats. It was particularly stressed that this should be a co-operative venture on the part of governments, industry and non-government safety agencies reaching out to grass-root networks and targetting non-wearers.

constructeurs automobiles, a été un pas dans la bonne direction. Toutefois, il est impossible de déterminer l'efficacité de ces ceintures sans avoir acquis une expérience considérable de leur utilisation. Il se peut que le que le principal avantage de ces dernières soit d'en accroître le port par les personnes assises à l'arrière, ce qui facilite l'application des lois adoptées en ce domaine. M^{me} Legault, de Transports Canada, laisse à entendre qu'en ce qui concerne les enfants, la ceinture de sécurité trois points n'est pas nécessairement plus efficace que la ceinture sous-abdominale et le coussin d'appoint, à cause du mauvais ajustement possible du baudrier.

Séance 2

Pendant cette deuxième séance du débat, on présente dix mémoires au nom de particuliers ou d'organismes. Ces documents figurent à l'annexe III du présent résumé. On trouvera ci-après un bref exposé des questions importantes soulevées au cours des échanges de vues qu'ils ont suscités.

Les représentants du Conseil canadien de la sécurité, de l'Association des consommateurs du Canada et de la Société des fabricants de véhicules automobiles appuient fortement l'instauration d'un programme national d'information du public et d'application des lois concernées, pour accroître les taux de port de la ceinture de sécurité et le bon usage des sièges d'auto pour enfant. Ils soulignent notamment que ce programme devrait être une initiative commune des gouvernements, de l'industrie et des organismes de sécurité non gouvernementaux, visant toutes les couches de population, et en particulier les non-utilisateurs de ces dispositifs de sécurité.

Several design and operational shortcomings of current restraint systems and child seats were raised by the representatives of the Consumers' Association of Canada, the Technical Univesity of Nova Scotia, and the Nova Scotia Safety Council. Noted particularly were problems of fitment for people outside of the "normal" design parameters, and more "fail-safe" designs and better instructions for child seats.

The in-use safety effectiveness of seat belts, and costs and benefits were discussed by representatives of Université de Montréal and the Insurance Corporation of British Columbia.

The importance of misuse of seat belts as a factor reducing their effectiveness was discussed. Mr. Lawson of Transport Canada noted that roadside survey data indicated that about 1 to 2 percent of drivers were wearing belts improperly. Professor Nowak of the University of Western Ontario felt that it was more prevalent than that in the experience of the University's accident investigation team, but could not give a specific estimate of its incidence.

Several questions followed the presentation by Mr. Hespeler of Mercedes-Benz on occupant restraint systems in their passenger cars. In response to those questions, he said that injury experience in collisions below the air bag deployment threshold of about 17 km/h change of velocity had been generally good. While complaints

Les représentants de l'Association des consommateurs au Canada, de la Technical University of Nova Scotia, et du Nova Scotia Safety Council signalent plusieurs défauts de conception et de fonctionnement des ensembles de retenue et des sièges d'auto pour enfant actuels. Ils soulignent notamment les problèmes d'ajustage qu'éprouvent les gens dont la conformation a quelque chose de particulier, et préconisent la mise au point d'un plus grand nombre de modèles "tout à fait sûrs", et de meilleures instructions sur l'utilisation des sièges d'enfant.

Les représentants de l'Université de Montréal et de l'Insurance Corporation of British Columbia discutent de l'efficacité réelle des ceintures de sécurité, ainsi que de leur coût et de leurs avantages.

On a également un échange de vues sur l'importance d'une mauvaise utilisation des ceintures en question en tant que facteur de réduction de leur efficacité. M. Lawson, de Transports Canada, fait remarquer que les données des enquêteurs routiers indiquent qu'environ un à deux pour cent des conducteurs ne portent pas correctement leur ceinture de sécurité. Le professeur Nowak, de l'université Western Ontario, se dit d'avis que d'après les constatations faites par l'équipe d'enquête sur des accidents de cette université, le pourcentage réel est plus élevé, mais il ne peut pas fournir une estimation précise.

Plusieurs questions suivent l'exposé de M. Hespeler, de la société Mercedes-Benz, sur les ensembles de retenue des occupants des voitures de tourisme construites par cette dernière. En réponse à ces questions, celui-ci déclare que l'expérience acquise en matière de blessures subies dans des collisions au moment d'une

about the non-deployment of the bag were commonly received, the occupants were generally uninjured. In Germany only, the windshield had a soft plastic layer on the interior surface. The cost of the Supplemental Restraint System (SRS), (i.e. a driver's side air bag and belt pretensioners on the passenger's side) was U.S. $880 and it was standard equipment on vehicles produced for the U.S. market.

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Session 3

The Chairman opened the third and final session of the forum by reviewing the principal issues that had been raised in earlier sessions. In particular, he identified the question of misuse of seat belts and the need for public education to address the problem, the need to promote the correct installation and use of child restraints, inspection and replacement of seat belts, the air bag as a supplementary restraint system, the net benefits of three-point seat belts in the rear seating positions, and the intrinsic and overall effectiveness of automatic belts. He commented that he was a little surprised at the lack of discussion of the need to mandate the installation of automatic restraints; discussion had focussed primarily on the promotion of correct seat belt use. He invited comments from the floor on those issues or others that participants considered relevant to the subject of the forum.

décélération inférieure à la décélération minimum d'environ 17 km/h qui déclenche le déploiement du coussin autogonflable a généralement été favorable. Même si ce constructeur reçoit beaucoup de plaintes au sujet du non-déploiement de ce dernier, les occupants des véhicules concernés ne subissent d'ordinaire aucune blessure. En Allemagne seulement, la surface interne du pare-brise est revêtue d'une couche de plastique molle. Le coût de l'ensemble de retenue supplémentaire (c.-à-d. un coussin autogonflable du côté du conducteur et un prétendeur de ceinture du côté du passager) est de 880 $ É.-U., et celui-ci est un équipement standard dans les véhicules destinés au marché américain.

Séance 3

Le Président ouvre la troisième et dernière séance du colloque en passant en revue les principales questions qui ont été soulevées au cours des séances précédentes. Il soulève en particulier la question du mauvais usage des ceintures de sécurité et de la nécessité d'informer le public pour éliminer ce problème, de promouvoir la bonne installation et l'utilisation correcte des ensembles de retenue d'enfant, l'inspection et le remplacement des ceintures de sécurité, et l'utilisation du coussin autogonflable en tant que dispositif de retenue supplémentaire, et il souligne les avantages nets du port de la ceinture trois points lorsqu'on est assis à l'arrière, ainsi que l'efficacité intrinsèque et globale des ceintures de sécurité automatiques. Il signale qu'il est un peu surpris du manque de discussion sur la nécessité de rendre obligatoire l'installation d'ensembles de retenue automatiques, car le débat a porté surtout sur

On the subject of seat belt fit for occupants of various sizes and shapes, Mr. Elliott commented that seat belt extenders were generally available for people who needed them, on request from the vehicle manufacturers. Mr. Hespeler commented that it was a practical impossibility to fit people of widely differing heights with the same upper anchorage position. Mercedes had therefore introduced adjustable upper anchorages in all its models three years ago. Mr. Preuss noted that specific models of Audi and Volkswagen also had adjustable upper anchorage locations for the front seat belts. Volkswagen also offered retrofit hardware to permit a permanent reduction in the height of the upper anchorage locations in the Rabbit. Mr. Scully said that all current models of BMW provided for an optional permanent reduction of 5 cm in the height of the upper anchorage point, except for the BMW 735i. That model provided an automatic anchorage adjustment determined by the seat position.

Mme Killens outlined her experiences of being in a severe car crash, and strongly recommended that three-point seat belts be included as standard equipment in the rear seats of passenger vehicles and that air bags be installed in the front seats to prevent facial injuries.

l'incitation des usagers de la route à bien porter leur ceinture de sécurité. Il invite les participants à lui faire part de leurs observations sur ces questions ou sur toute autre constatation qu'ils jugent pertinente.

Au sujet de l'ajustage de la ceinture de sécurité aux occupants de tailles et de formes diverses, M. Elliott fait observer que des rallonges de ceinture sont en général à la disposition des gens qui en ont besoin et qui en demandent aux constructeurs de leurs véhicules respectifs. M. Hespeler signale qu'il est pratiquement impossible pour des gens de tailles très diverses de bien se ceinturer lorsque l'ancrage supérieur reste dans la même position. La société Mercedes a par conséquent installé, il y a trois ans, des ancrages supérieurs réglables dans tous ses modèles. M. Preuss fait remarquer que certains modèles Audi et Volkswagen ont eux aussi des ancrages supérieurs ajustables pour les ceintures de sécurité avant. La société Volkswagen offre également du matériel permettant de diminuer en permanence la hauteur des ancrages supérieurs de ses voitures Rabbit. M. Scully déclare que tous les modèles de BMW actuels prévoient une réduction permanente facultative de 5 cm de la hauteur du point d'ancrage supérieur, sauf pour le modèle BMW 735i. Ce dernier permet un ajustage automatique des ancrages, déterminé par la position du siège.

Mme Killens signale qu'elle a déjà subi un grave accident de la route, et recommande fortement que la banquette arrière des voitures de tourisme soit munie de ceintures de sécurité trois points, en tant qu'équipement standard, et que des coussins autogonflables soient installés à l'intention des occupants des sièges (ou de la banquette) avant, pour les empêcher de subir des blessures au visage.

With reference to the installation of three-point seat belts in the rear of passenger cars, Mr. Elliott commented that most manufacturers had had them available as options but, since they were not popular, had not previously offered them as standard equipment. A number of manufacturers' representatives outlined their company's plans for the installation of three-point rear seat belts. It would appear that a wide choice of new vehicles will have this feature by 1988.

Dr. Green expressed concern that the manual lap belt that accompanied current two-point automatic belts would not be used and that Volvo's unsatisfactory experiences of some 18 years ago with two-point diagonal belts would be repeated. Mr. Hitchcock pointed out that, unlike the earlier two-point belts, all current systems included a knee bolster to prevent occupants from sliding under the seat belt in collisions. The extensive field data generated by the Volkswagen Rabbit in the U.S. showed that such systems were very effective, even in collisions where the vehicle experienced several spins. The major benefit of the lap belt resulted from reducing the risk of ejection, rather than from controlling the motion of the lower torso. While the intrinsic effectiveness of most restraint systems could be improved, their overall effectiveness depended both on usage and performance. A case could therefore be made for sacrificing some performance for an increase in usage.

En ce qui a trait à l'installation de ceintures de sécurité trois points sur la banquette arrière des voitures de tourisme, M. Elliott indique que la plupart des constructeurs mettent celles-ci à la disposition de leurs clients en tant qu'accessoires facultatifs, mais que parce qu'elles ne sont pas populaires, ils ne les ont pas encore offertes comme équipement standard. Un certain nombre de représentants des constructeurs font état des plans de leurs sociétés respectives en vue de l'installation de ceintures trois points à l'arrière. Il semble qu'un large éventail de véhicules neufs seront munis de ce genre de ceintures d'ici 1988.

Dr Green se dit préoccupé par le fait que la ceinture sous-abdominale manuelle accompagnant la ceinture automatique deux points actuelle ne sera pas utilisée, et que les expériences insatisfaisantes que les ceintures diagonales deux points ont values à la société Volvo il y a quelque 18 ans se répéteront.
M. Hitchcock signale que contrairement aux ceintures deux points antérieures, tous les ensembles de retenue actuels comprennent un appuie-genoux, destiné à empêcher les occupants de glisser sous leur ceinture de sécurité au moment d'une collision. Les nombreuses données d'utilisation de la Volkswagen Rabbit aux États-Unis ont montré que ce genre d'ensembles de retenue était très efficace, même au moment d'une collision où le véhicule faisait plusieurs tonneaux. Le principal avantage de la ceinture sous-abdominale a été la réduction du risque d'éjection, plutôt que le contrôle du mouvement de la partie inférieure du torse. On pourrait augmenter encore l'efficacité intrinsèque de la plupart des ensembles de retenue, mais dans l'ensemble, celle-ci dépend à la fois

There was some discussion of the danger to front seat passengers resulting from the improper use of reclining seats. Dr. Green stressed that correct restraint of a reclining occupant required the use of a crotch restraint, which was evidently not available in road vehicles. The need was noted to promote wider awareness of the dangers of travelling with the seat reclined.

Mr. McNabb of University of British Columbia cited a number of accidents involving rear impacts and asked why Transport Canada did not demand a higher level of seat back strength in its standards. He also asked why manufacturers apparently did not consider the seat back as part of the restraint system. Mr. Hitchcock responded that selecting the seat back strength or stiffness is a difficult design problem: in practice, the seat is as often too stiff as it is too flexible. In any event, he believed that the problem had rather low priority in the context of improving occupant protection. Mr. Ambroso commented that the manufacturers did treat the seat as part of the restraint system, although not the seat back, citing the attention that was paid to the design of the seat cushion and base in controlling occupant motion in frontal crashes.

de l'usage qu'on fait de ces derniers, et de leur rendement. On peut par conséquent justifier une certaine diminution dudit rendement au profit d'une augmentation du taux d'utilisation.

Les participants délibèrent au sujet du danger que présentent les sièges avant inclinables à leurs occupants. M. Green souligne que pour être bien retenu sur son siège, un occupant incliné doit utiliser une ceinture d'entrejambe, dont ne sont évidemment pas dotés les véhicules routiers. On signale la nécessité de sensibiliser davantage les usagers de la route au danger que court l'occupant d'un siège avant incliné.

M. McNabb, de l'université de la Colombie-Britannique, fait état d'un certain nombre de collisions arrière et demande pourquoi les normes de Transports Canada n'obligent pas les constructeurs d'automobiles à renforcer le dossier des sièges. Il demande également pourquoi les constructeurs n'ont manifestement pas considéré le dossier des sièges comme partie intégrante de l'ensemble de retenue. M. Hitchcock répond qu'il est difficile de déterminer judicieusement la résistance ou la rigidité du dossier des sièges: en pratique, il arrive aussi souvent que celui-ci soit trop rigide qu'il ne le soit pas assez. De toute façon, M. Hitchcock estime que le problème n'est pas très important en ce qui a trait à l'amélioration de la protection des occupants de véhicules automobiles. M. Ambroso fait observer que les constructeurs ont effectivement considéré les sièges comme faisant partie des ensembles de retenue, mais non pas leur dossier, en soulignant l'attention portée à la conception du capitonnage et de la base des sièges pour contrôler les mouvements des

The inconsistency perceived by children in requiring them to use seat belts in cars but not in school buses was raised by Mr. Andrunyk of Ontario Safety League in relation to Transport Canada's position on seat belts in school buses. Dr. Campbell explained that school buses were not generally designed to incorporate seat belts. Moreover, with the high level of passive protection afforded by the new high-backed seats, seat belts afforded little or no additional protection and in some instances could actually degrade the performance of the passive system. However, Transport Canada was currently evaluating a number of alternative seating systems incorporating seat belts. The results of that study were to be published in about a month, in conjunction with a statistical analysis of school bus safety in Canada. A final phase of the work was expected to lead, next year, to a definitive position on the question of seat belts in school buses, which were already the safest form of passenger transportation, next year.

The deterrent value of judgements of contributory negligence against accident victims who had not been wearing their seat belts was discussed. While the original concept of contributory negligence had involved the denial of compensation to persons who had contributed to their own losses or

occupants au moment d'une collision frontale.

Le manque de logique perçu par les enfants, qu'on oblige à porter leur ceinture de sécurité lorsqu'ils se déplacent en voiture alors qu'on ne le fait pas lorsqu'ils circulent dans les autobus scolaires, est souligné par M. Andrunyk de l'Ontario Safety League, à la lumière de la position de Transports Canada sur le port de la ceinture de sécurité dans ces derniers. Dr Campbell explique que les autobus scolaires n'ont généralement pas été conçus pour être munis de ceintures de sécurité. De plus, comme les nouveaux sièges à dossier élevé assurent un haut degré de protection automatique, ces ceintures n'offrent pratiquement aucune protection supplémentaire et, dans certains cas, pourraient effectivement diminuer ladite protection automatique. Toutefois, Transports Canada évalue actuellement un certain nombre d'autres modèles de siège comprenant une ceinture de sécurité. Le ministère doit publier les résultats de son étude dans environ un mois, en même temps que ceux d'une analyse statistique de la sécurité des autobus scolaires au Canada. On s'attend à ce que la dernière étape du travail mène l'année prochaine à l'adoption d'une position définitive sur le port de la ceinture de sécurité dans ces autobus, qui sont déjà le moyen de transport le plus sûr.

On discute du pouvoir de dissuasion des jugements rendus contre des victimes d'accidents qui se sont attiré leur triste sort en ne portant pas leur ceinture de sécurité. La notion initiale d'imprudence ou de négligence contributoire comportait le refus d'indemniser les personnes ayant

injuries, it had generally been replaced by apportionment of the responsibility between plaintiff and accused. In British Columbia, damages to the plaintiff were commonly reduced by 25 percent if he had not been wearing a seat belt, while in New Brunswick, Dr. Wilson of University of New Brunswick said the adjustment ranged from 15 to 40 percent. There was some feeling that the proportion would tend to increase with time and that it could begin to have a positive effect on seat belt use.

Several participants commented on the need for more extensive and effective public education to increase the use of seat belts. There was some debate on the responsibilities of the various agencies involved but general agreement on the necessity for public education to be sustained and intensive if it were to have any effect on behaviour. Dr. Jonah of Transport Canada concurred that short programmes certainly did not work but cautioned that sustained programmes of public education alone might not work either. There was, however, clear evidence of their effectiveness in combination with selective enforcement actions or direct incentives of the type used in workplace programmes to promote seat belt use.

The forum adjourned with thanks to all participants from the Chairman.

contribué à leurs propres pertes ou blessures, mais elle a généralement été remplacée par le partage de la responsabilité entre le plaignant et l'accusé. En Colombie-Britannique, les dommages-intérêts accordés au premier sont communément réduits du quart (25 pour cent) si celui-ci n'était pas ceinturé, tandis qu'au Nouveau-Brunswick, selon Dr Wilson de l'université du Nouveau-Brunswick, la diminution varie de 15 à 40 pour cent. Certains ont le sentiment que cette dernière tendra à augmenter avec le temps, et qu'elle pourrait influer favorablement sur le port de la ceinture de sécurité.

Plusieurs participants font état de la nécessité d'informer davantage et plus efficacement le public pour accroître l'utilisation de cette dernière. On discute un peu des attributions respectives des divers organismes concernés, mais on s'entend en général sur la nécessité de veiller à ce que cette information du public soit soutenue et intense de façon à avoir un effet quelconque sur le comportement des usagers de la route. Dr Jonah, de Transports Canada, reconnaît que les courts programmes d'information ont indubitablement échoué, mais il avertit les participants qu'à eux seuls, les programmes soutenus dans ce domaine risquent de ne pas avoir de succès eux non plus. Il y a toutefois des preuves évidentes de leur efficacité lorsqu'ils sont exécutés conjointement avec la prise de mesures sélectives d'application des lois prescrivant l'usage de la ceinture de sécurité, ou d'initiatives incitatrices directes du genre de celles des programmes de mise en oeuvre dans les lieux de travail pour promouvoir ledit usage.

Le Président ajourne le débat en remerciant tous les participants.

ANNEX I: TRANSPORT CANADA PRESS RELEASE

ANNEXE I: COMMUNIQUÉ DE TRANSPORTS CANADA

ANNEX 1

Canada

INFORMATION

No. 241/86 For release
November 26, 1986

SEAT BELTS AND SAFE DRIVING WEEK

OTTAWA - The Honorable John C. Crosbie, Minister of Transport, and the Honorable André Bissonnette, Minister of State for Transport, today released a Transport Canada discussion paper on occupant restraints in vehicles while declaring support for Safe Driving Week, Dec. 1-7.

"Transport Canada, the Canada Safety Council and its provincial counterparts have fully supported **Safe Driving Week** for years and will continue to do so as long as there are drivers on the road," Mr. Crosbie said.

"A comprehensive, Transport Canada-produced document on occupant restraint systems has been printed to provide a basis for discussion next spring between the federal government, provincial governments, industry and other interest groups," he said. "The end result of these discussions, it is hoped, will be increased use of existing seat belts as well as equipment improvements in new cars."

Transport Canada has also developed specifications for the mandatory installation of daytime running lights in all cars, trucks and buses built after 1988. Proposed manufacturers' regulations were announced in the **Canada Gazette**, part one, last summer.

"To increase the noticeability of cars, trucks and buses on the highways, we have proposed that vehicle manufacturers install automatic, ignition-connected daytime running lights," Mr. Bissonnette said. "While most buses and emergency vehicles now use headlights in daytime, drivers who buy a car, truck or bus built after 1988 can expect their fog lights, parking lights or reduced-intensity headlights to turn on as soon as the engine is operating and the vehicle is in gear."

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Between proposal and implementation, the minister said, there will be ample time for the manufacturer to develop which daytime running light system is most effective on each of the vehicles it builds and ensure the systems conform to federal performance specifications.

Transport Canada has studied the use of daytime running lights for 10 years and reviewed research on their effectiveness in Scandinavian countries where mandatory use has been practised for years.

Transport Canada expects that mandatory daytime running light use would cut daytime multiple vehicle collisions by 10-20 per cent and save $200 million a year in medical and accident costs.

The lighting system is expected to add $10-$20 to the cost of a new vehicle.

"I believe the mandatory installation of daytime running lights would improve road safety and driver habits in Canada," Mr. Crosbie said.

"During **Safe Driving Week,** we should also remind ourselves not to drink and drive. I have two grandchildren, as I have said in my radio message, and I want to see them safe and sound this Christmas. See that the young ones in your car and you, too, are buckled up and, above all, drive safely."

Contact: Geneviève O'Sullivan
Minister's Office
(613) 996-7501

BACKGROUNDER No. 241/86 (a)

Daytime Running Lights

The Minister of Transport announced in July 1986, a Transport Canada proposal that all new cars, multi-purpose vehicles, trucks and buses, be fitted with daytime running lights by 1989.

The proposal appeared earlier in the **Canada Gazette,** Part 1.

The safety measure is a Canadian road safety initiative, and was based on a decade of federal research which included the experience of some European and Scandinavian countries.

The running lights, which increase the noticeability ("conspicuity") of vehicles, could cut daytime multiple-vehicle collisions by 10 to 20 per cent -- the equivalent of a three - to six-per-cent drop in the overall annual accident rate and a saving of up to $50 million a year.

Transport Canada researchers have studied daytime running lights closely, namely: the systems' effects on driver performance and decision-making; light output measurements on various lamps; investigations on the optimum light intensity; emplacement of daytime running light use surveys on public roads; electrical circuit and component studies; and monitoring the effects of continuous light use on the reliability of Transport Canada vehicles.

The lights are estimated to add $10 - $20 to the cost of a new vehicle and switch on and off automatically with ignition.

The daytime running light function could be provided by reduced-intensity headlights, brighter parking lights, fog lights or completely separate daytime running lights, fog lights or completely separate daytime running light units. To avoid glare problems and to ensure satisfactory bulb life, headlights would have to be opeated at reduced intensity when in daytime running light mode. This would be achieved by lowering the operating voltage.

Bulb burn-outs, energy use and wear on the alternator would be minimized. Lights, other than the two running lights, would not be required to operate with the headlights switch in the off position. The daytime running lights would be dim enough so that drivers would continue to be remined to switch on their headlights as darkness fell; the lack of instrument panel illumination could be a further cue.

The Canadian Belt Fit Test Device

Although infrequent, abdominal injuries caused either by a lap belt or the lap portion of a three-point seat belt, can be life-threatening. Such injuries may occur when the lap belt rides up and over the pelvic area during a frontal collision or if the belt is improperly positioned above the pelvis at the outset of the collision. The latter is suspected in most instances of injury.

As part of Transport Canada's ongoing efforts to improve motor vehicle safety, the department has supported the development of a prototype "belt fit test device" which examines seat belt fit on the basis of a simple, in-vehicle test.

The test device consists of a standard, three-dimensional machine modified to accept a "lap" and "chest" form of a Canadian adult.

The machines were developed and tested by Biokinetics and Associates Ltd. and TES Ltd., both of Ottawa.

Each test device provides a series of scales which allow the position of the seat belt assembly to be pinpointed relative to specific "anatomical landmarks" located on the lap and chest forms.

Transport Canada regulations for motor vehicle manufacturers specify that all seat belt assemblies installed meet specific geometric, strength and hardware requirements.

The feasibility of employing the belt fit test device as a means of regulating seat belt fit is currently being examined.

A series of six kits have been fabricated which allow the assembly of a belt fit test device. These kits will be made available to other government agencies and vehicle manufacturers for evaluation and use.

BACKGROUNDER No. 241/86 (c)

Crash Testing

As part of its contribution towards motor vehicle safety in Canada, Transport Canada administers and enforces the **Motor Vehicle Safety Act and Regulations** which establish vehicle fitness and minimum safety performance standards. They apply to motor vehicles manufactured in Canada or imported into Canada.

Responsibility for the design, testing and certification of compliance with federal standards, remains with the vehicle manufacturer who must ensure and certify that their vehicles comply with all applicable safety standards in effect on the date of manufacture.

A statement of compliance label, which the manufacturer attaches to each vehicle, is evidence of this certification.

The Road Safety and Motor Vehicle Regulation Directorate of Transport Canada, Ottawa, monitors the manufacturers' program, in part, through the selective enforcement testing of representative vehicles purchased at the retail market by the department.

Transport Canada's Motor Vehicle Test Centre at Blainville, Qué., carries out vehicle crashes ("frontal, side and rear impacts") on selected vehicles to ensure compliance with specific federal safety standards. Such safety standards include:

CMVSS 204	Steering Column Rear and Displacement
CMVSS 212	Windshield Retention
CMVSS 219	Windshield Zone Intrusion
CMVSS 301	Fuel System Integrity

Other crash test programs are conducted in support of research and development activities in the field of occupant protection and vehicle crashworthiness.

A 12-metre-thick, 180 metric tonne concrete block, which absorbs no energy from the impact, is used as the crash barrier for frontal impacts. The vehicle to be tested is propelled into the wall at about 48 km/h (30 mph).

Crash testing began at the Blainville test centre in 1979. About 25-30 vehicles are tested each year.

No. 241/86 (d)

BACKGROUNDER

Automatic Occupant Restraints

The United States government has adopted a regulation requiring that "passive" restraint systems be provided for the two front occupants in 10 per cent of 1987 model automobiles manufactured in the United States. The "passive" restraints can be either air bags or automatic seat belts. By 1990, it is anticipated that 100 per cent of the cars produced in the U.S. for American consumers will be equipped with "passive" restraints. This regulation could, however, be rescinded by the U.S. Secretary of Transportation if enough state governments introduce appropriate seat belt use legislation.

Transport Canada Position

1. No similar regulation is contemplated in Canada. A full review of policy options for improved motor vehicle occupant protection was completed recently.

2. The seat belt wearing rate in Canada now exceeds 55 per cent and continues to improve each year. Seat belt use in the U.S. was estimated recently at 34 per cent. Some European countries have seat belt wearing rates of more than 90 per cent.

3. Transport Canada safety standards require the installation of three-point inertia reel seat belts in front outboard seats. Lap belts are required for other seats in both countries. These standards are there to ensure the safety of Canadians travelling in passenger vehicles, light trucks or vans.

4. Since 1972, vehicle manufacturers have had the option of installing automatic restraint system for vehicles destined for Canada, provided that they can be shown to give an equivalent level of safety to conventional seat belts.

5. Canadians will have the option of ordering air bags to supplement the required three-point belts in a few vehicle models.

ANNEX II: PRESENTATIONS - SESSION I

ANNEXE II: EXPOSÉS - SÉANCE I

PRESENTATION OF DAVID KILGOUR, M.P.

THANK YOU FOR COMING TODAY TO DISCUSS WITH TRANSPORT CANADA SOME VITAL ISSUES OF AUTOMOTIVE SAFETY THAT AFFECT US ALL.

OCCUPANT RESTRAINTS REPRESENT ONE OF THE MOST EFFECTIVE SAFETY MEASURES IN REDUCING DEATH AND INJURIES IN AUTOMOBILE ACCIDENTS. THEIR EFFECTIVENESS CANNOT BE OVER-EMPHASIZED. HOWEVER, HAVING THE SYSTEMS INSTALLED IN THE AUTOMOBILE IS ONLY THE FIRST STEP - THEY MUST BE WORN EACH AND EVERY TIME. IN CANADA, EIGHT PROVINCES CURRENTLY HAVE SEATBELT LEGISLATION AND WE WERE VERY GLAD TO HEAR THAT BOTH ALBERTA AND PRINCE EDWARD ISLAND HAVE INDICATED THAT THEY INTEND, AS WELL, TO LEGISLATE THEIR USE. CURRENTLY, THE USAGE RATE IN CANADA STANDS AT A LITTLE OVER 60 PER CENT AND THAT FIGURE COULD RISE AFTER THE LEGISLATION IS IN PLACE IN THOSE TWO PROVINCES.

FROM THE FEDERAL POINT OF VIEW, WE HAVE NOT BEEN STANDING STILL WITH RESPECT TO THE PERFORMANCE AND SAFETY OF CURRENT SEATBELT SPECIFICATIONS. OUR RESEARCH HAS BEEN LOOKING AT WAYS TO MORE EFFECTIVELY TEST THE PERFORMANCE OF THE SYSTEMS AND AT HOW THEY CAN BE IMPROVED. TWO TEST DEVICES THAT HAVE BEEN DEVELOPED AND USED ARE THE MODIFIED HYBRID III DUMMY AND A NEW PROTOTYPE SEATBELT FIT DEVICE. THE HYBRID III DUMMY INCLUDES A BREAKABLE FACE INSERT WHICH WILL IMPROVE OUR ABILITY TO DETERMINE HOW WELL ANY RESTRAINT SYSTEM PREVENTS FACIAL INJURY.

THE CANADIAN BELT FIT TEST DEVICE IS BEING DEVELOPED TO EXAMINE SEATBELT FIT ON THE BASIS OF A SIMPLE, IN-VEHICLE TEST. IMPROVED BELT FIT WILL REDUCE EVEN FURTHER THE POSSIBILITY OF SERIOUS INJURIES DURING A CAR CRASH. KITS HAVE BEEN MADE AVAILABLE TO VEHICLE MANUFACTURERS AND OTHER GOVERNMENT AGENCIES FOR EVALUATION AND USE.

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WITH RESPECT TO CHILD RESTRAINTS, THE DEPARTMENT RECENTLY ANNOUNCED THAT WE WILL REQUIRE CARS MANUFACTURED FROM 1989 ONWARDS BE EQUIPPED WITH THE APPROPRIATE HARDWARE FOR SECURING TETHERED CHILD RESTRAINTS.

ALL OF THESE INITIATIVES HAVE BENEFITTED FROM THE COMMENTS, CONSULTATIONS AND REPRESENTATIONS WE HAVE RECEIVED FROM THE GENERAL PUBLIC, INDUSTRY AND ORGANIZATIONS SUCH AS THOSE REPRESENTED HERE TODAY.

I ANTICIPATE THAT THE INFORMATION RESULTING FROM THIS FORUM WITH CONTINUE TO HELP US IN MAKING FURTHER IMPROVEMENTS TO MOTOR VEHICLE SAFETY STANDARDS.

I WOULD LIKE TO TAKE A MINUTE TO COMMENT ON TWO ISSUES THAT HAVE GENERATED PUBLIC INTEREST IN THE RECENT PAST - THE SAFETY OF CHILD SEATS AND LAP BELTS FOR REAR PASSENGERS.

THE SAFETY STANDARDS FOR CHILD RESTRAINTS REQUIRES, AMONG OTHER SPECIFICATIONS, THAT THE FORWARD MOTION OF A CHILD'S HEAD, IN THE EVENT OF AN ACCIDENT, MUST NOT EXCEED CERTAIN LIMITS. OVER THE PAST YEAR, TRANSPORT CANADA HAS TESTED TWO TETHERLESS CHILD CAR SEATS TO SEE IF THESE PRODUCTS MET OUR SAFETY STANDARDS. THESE TESTS DONE BY THE DEPARTMENT IN TORONTO SHOWED THAT THE DOREL "SAFE-T-RYDER" MODEL CHILD CAR SEAT AND BO PEEP'S "HI-RIDER" DIDN'T MEET EXISTING SAFETY STANDARDS.

.../3

THE TWO COMPANIES WERE NOTIFIED IMMEDIATELY BECAUSE OF THE POTENTIAL FOR HEAD INJURIES TO INFANT PASSENGERS AND BY OCTOBER 1986, TESTS BY THE DEPARTMENT AND THE MANUFACTURERS CONCLUDED THAT NEITHER SEAT WITHOUT A TETHER STRAP COMPLIED WITH REGULATIONS.

THREE WEEKS AGO, THE DEPARTMENT MADE A PUBLIC ANNOUNCEMENT URGING PARENTS TO OBTAIN AND USE THE TOP TETHER STRAPS FOR THESE TWO TETHERLESS SEATS. WITH THE STRAP, THEY WILL COMPLY AND PROVIDE MAXIMUM PROTECTION FOR THE INFANT OCCUPANT.

SINCE FOUR-FIFTHS OF CHILD CAR SEATS SOLD IN CANADA DURING THE LAST TWO YEARS DO NOT HAVE TETHERS, TRANSPORT CANADA HAS INCREASED ITS TESTING PROGRAM FOR CHILD RESTRAINTS TO ENSURE NO SUB-STANDARD SEATS ARE ON THE MARKET AND RESULTS WILL BE AVAILABLE BY MAY.

WITH RESPECT TO REAR SEATBELTS, TRANSPORT CANADA REGULATIONS NOW REQUIRE EITHER A LAP BELT OR A THREE-POINT SEATBELT TO BE INSTALLED IN THE REAR SEATING POSITIONS OF CARS, LIGHT TRUCKS AND VANS.

VIRTUALLY EVERY STUDY ON SEATBELT EFFECTIVENESS HAS CONCLUDED THAT THE RISK OF SERIOUS INJURY OR DEATH IS GREATLY DIMINISHED BY THE USE OF LAP BELTS BY REAR OCCUPANTS AND THREE-POINT SHOULDER BELTS BY THOSE IN FRONT. IN ADDITION, DATA ON ACCIDENTS IN CANADA SHOW THAT ADDITIONAL PROTECTION AFFORDED REAR-SEAT OCCUPANTS BY LAP BELTS IS COMPARABLE TO THAT FOR FRONT OCCUPANTS BY THE SHOULDER-LAP BELTS.

.../4

RECENTLY, THE DEPARTMENT WROTE EACH MANUFACTURER AND IMPORTER ASKING FOR THEIR PLANS WITH RESPECT TO THREE-POINT SEATBELTS IN THE REAR OUTBOARD POSITIONS. MOST MANUFACTURERS HAVE INDICATED THAT THEY WILL HAVE THREE-POINT OCCUPANT RESTRAINTS FOR REAR OUTBOARD PASSENGERS ON SOME MODELS WITHIN THE NEXT YEAR. ALL HAVE INDICATED THAT OVER THE NEXT FEW YEARS THEY HAVE PLANS TO EXTEND THIS TO ADDITIONAL MODELS. MANY HAVE INDICATED THAT THEY HAVE KITS AVAILABLE THAT CAN BE INSTALLED BY THE DEALER AT THE CONSUMER'S REQUEST.

TRANSPORT CANADA IS PLEASED WITH THIS COMMITMENT ON THE PART OF CANADIAN MOTOR VEHICLE MANUFACTURERS AND IMPORTERS WHICH WILL RESULT IN INCREASED FITMENT OF THREE-POINT REAR SEATBELTS IN A SHORTER TIMEFRAME THAN COULD NORMALLY BE ACHIEVED BY GOVERNMENT REGULATION. THIS IS AN OUTSTANDING EXAMPLE OF THE BENEFITS OF GOVERNMENT AND INDUSTRY CONSULTATION AND CO-OPERATION ON SAFETY ISSUES.

WHILE THIS DEVELOPMENT IS MOST WELCOME, A REVISED CANADIAN STANDARD ON THREE-POINT REAR SEATBELTS MAY ALSO BE DESIRABLE WITHIN THE NEXT TWO TO FOUR YEARS IN ORDER TO GUARANTEE A UNIFORM LEVEL OF SAFETY AND ACHIEVE HARMONIZATION WITH REGULATIONS IN OTHER COUNTRIES AND THEREBY MINIMIZE COSTS AND PREVENT INTERNATIONAL TRADE PROBLEMS.

WE ARE, THEREFORE, TAKING THIS OPPORTUNITY TO REQUEST MANUFACTURERS, IMPORTERS, AUTOMOBILE USERS AND CONCERNED NATIONAL ORGANIZATIONS TO SUBMIT REPRESENTATIONS TO THE DEPARTMENT DURING THE NEXT SIX MONTHS ON A POSSIBLE AMENDMENT TO THE EXISTING CANADIAN SAFETY STANDARD FOR REAR SEATBELTS IN PASSENGER CARS.

.../5

IN CONCLUSION, IT IS IMPORTANT TO NOTE THAT ROAD ACCIDENTS ACCOUNT FOR MORE INJURIES AND DEATHS THAN ALL OTHER MODES OF TRANSPORT COMBINED; MORE THAN FOUR THOUSAND MEN, WOMEN AND CHILDREN LOST THEIR LIVES IN TRAFFIC ACCIDENTS LAST YEAR. THAT IS A GREAT LOSS TO THE NATION AND A TRAGEDY TO FAMILIES AND FRIENDS. WE MUST CONTINUE TO STRIVE TO REDUCE THIS NUMBER NOT ONLY THROUGH REGULATION BUT THROUGH THE RAISING OF AWARENESS AND THE PROMOTION OF SAFE DRIVING PRACTICES.

WE WELCOME AND APPRECIATE YOUR INTEREST AND COMMENTS THAT WILL BE BROUGHT FORTH THROUGH THIS PUBLIC FORUM. REST ASSURED THAT YOUR PRESENTATIONS WILL RECEIVE THE DEPARTMENT'S FULL AND CLOSE ATTENTION.

PRESENTATION OF FRANCE LEGAULT, TRANSPORT CANADA

PUBLIC FORUM PRESENTATION - Wednesday March 25, 1987

INFANT RESTRAINT SYSTEMS

- for newborns up to 9 kg
- must be rear facing
- must have at least a 3-point harness
- must be capable of being restrained solely by a lap or a lap and shoulder belt
- the standard establishes performance requirements under static and dynamic conditions and in the areas of labelling and instructions
- static requirements
  - address flammability and energy absorbtion characteristics of the materials used
  - quality of webbing and hardware
- dynamic requirements
  - limit the rotation of restraint seat back with respect to the vertical
  - dummy must be contained

CHILD RESTRAINT SYSTEMS

- for children of any weight range between 9 and 22 kg (although most manufacturers design their restraints for children up to 18 kg)
- in Canada forward facing
- must have an upper torso, a lower torso and crotch restraint for the child in the form of a harness or shields or a combination of both
- must be capable of being restrained solely by a lap or a lap and shoulder belt or by belts and one additional tether strap

- as for IRS the standard establishes static and dynamic performance requirements and criteras for labelling and instructions
- the static requirements are similar to those for infant restraint systems
- dynamic requirements – limit the forward head excursion and maximum chest deceleration in a simulated crash

BOOSTER CUSHION

- for children over 18 kg
- simple device to elevate the child to better adapt an adult seat belt low on the child's hips
- it also permits the child to see better and the child is more likely to remain restrained

TETHER ANCHORAGES

- will become effective January 1, 1989
- as many anchorages as there are designated seating positions for a row of rear seats will be required
- an anchorage may be a hole or a threaded hole or a device combining the hardware
- hardware will be required at at least one predetermined position
- regulation incorporates strength and location requirements
- by the end of 1987 Transport Canada will publish a Part I proposal to ensure that CRS can be installed in vehicles at seating positions equipped with passive protection

MANUAL BELTS

- may be a lap or a lap and shoulder belt depending on the seating position in the vehicle

- must be a non-detachable lap and shoulder belt at least at the front outboard positions

- the shoulder portion must be fitted with an emergency locking retractor

- the system illustrated in this slide has a continuous lap and shoulder belt fitted to a vehicle sensitive emergency locking retractor, the retractor could be webbing sensitive or a combination of both, other components including the push button release, the sliding tongue and the D-ring are also illustrated

- the applicable standards set minimum requirements for the strength of webbing and hardware before and after certain conditioning procedures

- the strength of anchorages and the angle of the belts are also specified

RESTRAINTS FOR THE DISABLED

- postural positioning devices or orthesis which, because of the individual's disability, have to be used when travelling in a motor vehicle

- two general types - custom restraints built by rehabilitation centres
  - production restraints that presently have to meet the provisions of the child restraint regulations

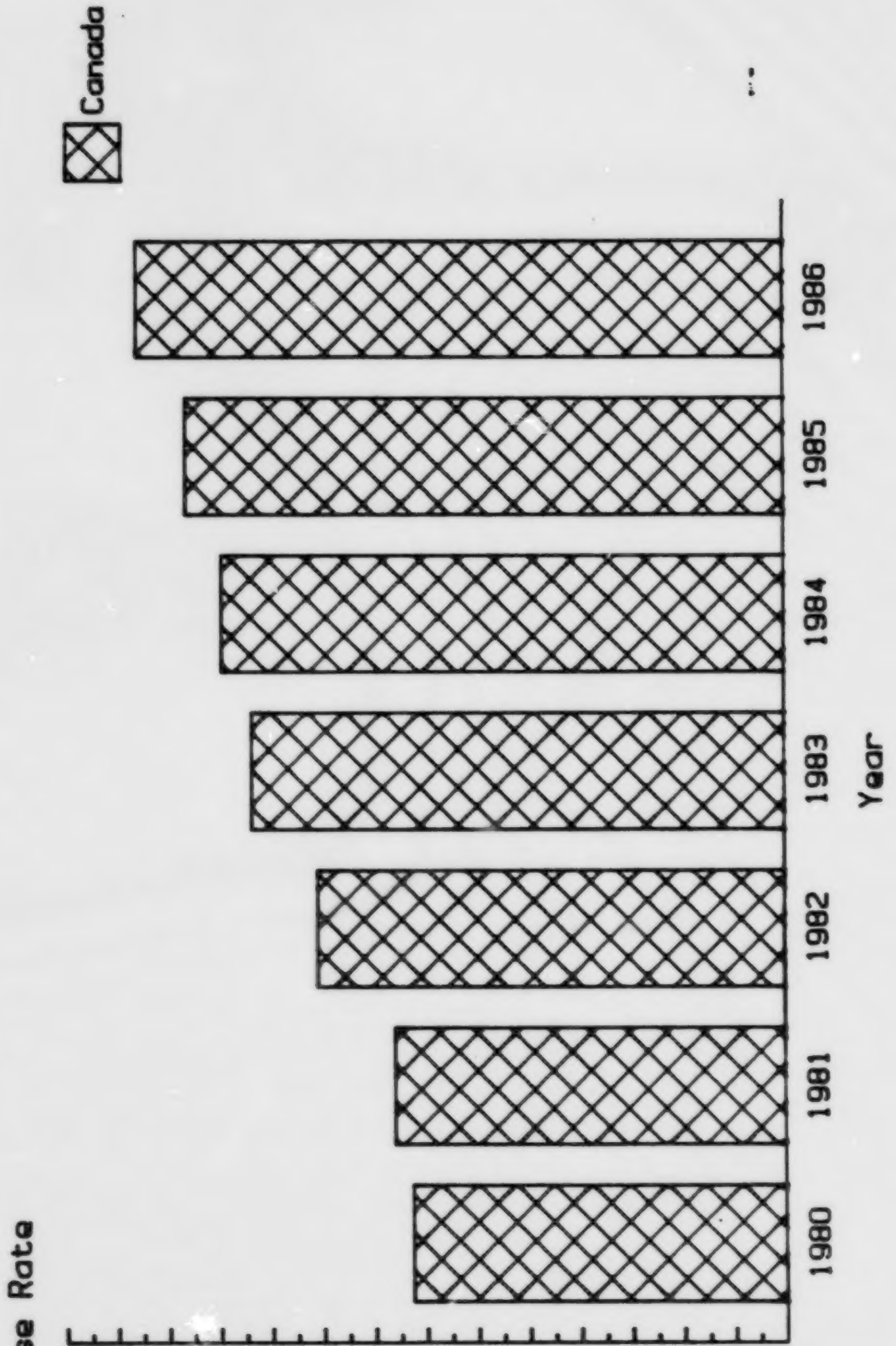
- the system shown here is a production type device which dubbles as a stroller outside the vehicle

- this restraint was part of test program with almost 20 other different types of restraints

- from test program a Part I proposal will be published at the end of the calendar year to enable rehabilitation professionals to offer their patients safe devices

PRESENTATION OF DR. BRIAN JONAH, TRANSPORT CANADA

% OF DRIVERS WEARING SHOULDER BELTS IN ALL CARS
CANADA - 1980-1986



NATIONAL CONCERN FOR ROAD SAFETY SURVEY

Objectives

- Assess knowledge of, opinions toward and willingness to pay for various vehicle safety features
- Assess perceived effectiveness of alternative road safety countermeasures
- Assess perceived danger of various situations

SURVEY METHODS

- 2,207 respondents
- Eligible if 16, licensed and had driven last 30 days
- Interviews conducted in respondent's home
- Survey conducted last 2 weeks of March, 1986

SAMPLE CHARACTERISTICS

- Median age - 37 years
- 57% male
- 66% graduated from high school
- Median income $33,000
- 85% drive car
- 72% own car
- 20% intend to buy new car or LTV in 2 years

TABLE 1

AWARENESS OF AUTOMATIC RESTRAINTS BY YEAR

ITEM	YEAR 1986	 1981
AIR BAGS AS SAFETY FEATURE ON NEXT VEHICLE	16.8[A]	N/A
AIR BAGS AS ALTERNATIVE PROTECTION DEVICE	55.8	43.8
HAD HEARD OF AIR BAGS	83.7	66.9
AUTO. BELTS AS SAFETY FEATURE ON NEXT VEHICLE	2.6	N/A
AUTO. BELTS AS ALTERNATIVE PROTECTION DEVICE	7.5	7.1
HAD HEARD OF AUTOMATIC BELTS	26.4	21.6

[A] PERCENT

TABLE 2

PERCEIVED EFFECTIVENESS OF AUTOMATIC RESTRAINTS (1986)

RESTRAINT	NOT AT ALL EFFECTIVE	MODERATELY EFFECTIVE	VERY EFFECTIVE
AIR BAGS	8.3[A]	28.9[B]	62.8[C]
AUTOMATIC BELTS	23.4	38.0	38.7
SHOULDER BELTS IN REAR SEAT	13.7	38.3	48.0

[A] PERCENT GIVING 0 OR 1 ON 0-6 RATING SCALE

[B] PERCENT GIVING 2,3 OR 4

[C] PERCENT GIVING 5 OR 6

TABLE 3

FAVOURABILITY TOWARD AUTOMATIC RESTRAINTS BY YEAR

	YEAR	
ITEM	1986	1981
AIR BAGS	68.4[A]	64.0
AUTOMATIC SEAT BELTS	43.8	47.1
REQUIRE MANUFACTURERS TO INSTALL AUTOMATIC BELTS	41.1	N/A

[A] PERCENT FAVOURABLE

TABLE 4

LIKELIHOOD OF DEFEATING AUTOMATIC RESTRAINTS BY YEAR

	YEAR	
ITEM	1986	1981
LIKELY DISCONNECT AUTOMATIC BELTS	18.2-30.8[A]	21.9-38.3
UNLIKELY TO USE BELT WITH AIR BAG	17.5-32.4[B]	25.4-48.5

[A] PERCENT VERY LIKELY/AT LEAST SOMEWHAT LIKELY TO DISCONNECT BELTS

[B] PERCENT NOT AT ALL LIKELY/AT MOST SOMEWHAT LIKELY TO USE BELT

TABLE 5

LIKELIHOOD OF DEFEATING AUTOMATIC RESTRAINTS BY CURRENT MANUAL BELT USE (1986)

	SEAT BELT USE		
ITEM	NEVER	SOMETIMES	ALWAYS
LIKELY DISCONNECT AUTO BELTS	56.4[A]	36.7	22.7
UNLIKELY USE BELT WITH AIR BAG	75.5[B]	45.1	12.1

[A] PERCENT AT LEAST SOMEWHAT LIKELY TO DISCONNECT BELTS WITHIN BELT USE CLASS

[B] PERCENT AT MOST SOMEWHAT LIKELY TO USE BELT WITHIN BELT BELT USE CLASS

TABLE 6

PREFERENCE FOR RESTRAINT SYSTEM BY YEAR

PREFERENCE	YEAR 1986	 1981
MANUAL BELTS	50.5[A]	59.8
AUTOMATIC BELTS	20.6	19.9
AIR BAGS	25.5	17.1
DON'T KNOW	3.4	3.2

[A] PERCENT

TABLE 7

PREFERENCE FOR RESTRAINT SYSTEM BY CURRENT MANUAL BELT USE (1986)

	SEAT BELT USE		
PREFERENCE	NEVER	SOMETIMES	ALWAYS
MANUAL BELTS	43.3[A]	45.1	54.0
AUTOMATIC BELTS	11.3	23.9	22.6
AIR BAGS	42.3	28.1	20.1
DON'T KNOW	3.1	2.9	3.3

[A] PERCENT OF THOSE NEVER USING BELT PREFERRING VARIOUS SYSTEMS

TABLE 8

WILLINGNESS TO PAY FOR RESTRAINT SYSTEMS (1986)

RESTRAINT SYSTEM	NEVER CHOOSE	AMOUNT WILLING TO PAY			
		CHOOSE IF NO COST	UP TO $100	UP TO $200	$200+
AIR BAGS	17.3[A]	23.4	13.7	18.6	16.6
AUTOMATIC BELTS	38.2	28.7	11.7	8.5	4.2
SHOULDER BELTS IN REAR	17.5	36.9	16.5	8.7	2.3

[A] PERCENT

PRESENTATION OF DANIUS DALMOTAS, TRANSPORT CANADA

PRESENTATION

PUBLIC FORUM ON OCCUPANT RESTRAINTS

RESTRAINT EFFECTIVENESS PORTION

SLIDE #1 : - BACKGROUND

- THE RELATIVE EFFECTIVENESS OF MANUAL SEAT BELTS AND VARIOUS AUTOMATIC RESTRAINT SYSTEM DESIGNS IN REDUCING THE RISK OF INJURY TO MOTOR VEHICLE OCCUPANTS HAS BEEN THE SUBJECT OF CONSIDERABLE STUDY AND DEBATE OVER THE LAST TWO DECADES.

- THE RECENT U.S. DECISION TO MANDATE THE INSTALLATION OF AUTOMATIC HAS SERVED TO HEIGHTEN INTEREST IN WHAT ROLE AUTOMATIC RESTRAINT SYSTEMS SHOULD PLAY IN CANADA.

- THE DEPARTMENT RECENTLY REVIEWED AND UPDATED ITS OWN ESTIMATES OF EFFECTIVENESS FOR THE VARIOUS AVAILABLE COMPETING FORMS OF OCCUPANT RESTRAINT, BOTH MANUAL AND AUTOMATIC.

- I WILL ATTEMPT TO QUICKLY SUMMARIZE THE PRINCIPAL FINDINGS OF THIS REVIEW.

- BY WAY OF BACKGROUND, THE TERM "EFFECTIVENESS" WILL BE EMPLOYED TO DENOTE THE REDUCED LIKELIHOOD OF INJURY WHILE RESTRAINED COMPARED TO BEING UNRESTRAINED.

- THE EFFECTIVENESS ESTIMATES ARE EXPRESSED IN TERMS OF THREE RANGES OF INJURY SEVERITY:

    - FATALITIES ;

    - MAJOR INJURIES WHICH DENOTE NON-FATAL INJURIES OF AIS 2 TO 5 SEVERITY ;

AND - MINOR INJURIES WHICH DENOTE AIS 1 LEVEL INJURIES.

- ALL OF THE EFFECTIVENESS ESTIMATES ARE EXPRESSED IN TERMS OF INTERVALS. THE WIDTH OF THE INTERVAL REFLECTS THE LEVEL OF UNCERTAINTY ASSOCIATED WITH THE EFFECTIVENESS ESTIMATES.

SLIDE #2 (OPEN): - MANUAL VS AUTOMATIC SEAT BELTS

- IN CANADA, MANUAL THREE-POINT SEAT BELTS HAVE, AND CONTINUE, TO REPRESENT THE STANDARD AGAINST WHICH THE PERFORMANCE OF ALL OTHER COMPETING RESTRAINT SYSTEMS IS MEASURED.

- THE DEPARTMENT'S CURRENT BEST ESTIMATES OF THE EFFECTIVENESS OF MANUAL THREE-POINT BELT SYSTEMS ARE THAT THEY REDUCE THE LIKELIHOOD OF :

    - FATAL INJURY BY SOME 40 TO 50 %;
    - MAJOR INJURY BY SOME 45 TO 55 %;

  AND - MINOR INJURY BY SOME 10 TO 20 %.

SLIDE #2 (CLOSED):

- IF WE NOW SUPERIMPOSE THE EFFECTIVENESS INTERVALS DERIVED FOR AUTOMATIC SEAT BELTS, IT CAN BE SEEN THAT IN THE CASE OF AUTOMATIC THREE-POINT SEAT BELTS WE WOULD EXPECT AN EFFECTIVENESS IDENTICAL TO THAT OF CURRENT MANUAL 3-POINT SEAT BELTS.

- THOUGH NOT SHOWN ON THE SLIDE, WE WOULD ALSO EXPECT THIS TO BE THE CASE FOR AUTOMATIC 2-POINT SEAT BELT SYSTEMS WHEN USED IN CONJUNCTION WITH A MANUAL LAP BELT.

- THESE ESTIMATES ASSUME CONTINUED COMPLIANCE OF AUTOMATIC SEAT BELT ASSEMBLIES TO THE ANCHORAGE LOCATION REQUIREMENTS OF CMVSS 210.

- IN THE ABSENCE OF SUCH COMPLIANCE, WE WOULD EXPECT SOME DEGRADATION IN OVERALL PERFORMANCE.

- IN THE CASE OF NON-COMPLYING 2-POINT AUTOMATIC SEAT BELT SYSTEMS, WE WOULD ANTICIPATE A 5 TO 10 PERCENTAGE POINT LOSS IN EFFECTIVENESS RELATIVE TO MANUAL 3-POINT SEAT BELTS.

SLIDE #3 (OPEN): - AIR CUSHION VS MANUAL 3-POINT SYSTEM

- AGAIN, STARTING WITH THE EFFECTIVENESS OF THE MANUAL 3-POINT SEAT BELT, WE CAN SHOW THE RELATIVE EFFECTIVENESS OF AIR CUSHION SYSTEMS.

SLIDE #3 (CLOSED):-

- FIRST, LET US EXAMINE THE SITUATION WHEN THE AIR CUSHION IS USED BY ITSELF.
- IN THIS CASE WE WOULD EXPECT A MUCH REDUCED LEVEL OF EFFECTIVENESS IN COMPARISON TO THE MANUAL 3-POINT SYSTEM, POSSIBLY LESS THAN HALF AS EFFECTIVE.
- THE VERY WIDE EFFECTIVENESS INTERVALS ASSOCIATED WITH THE AIR CUSHION SYSTEM HIGHLIGHTS HOW UNCERTAIN WE ARE ABOUT THESE ESTIMATES. AVAILABLE FIELD DATA ON THE AIR CUSHION SYSTEM ARE SIMPLY TOO SPARSE TO DERIVE RELIABLE ESTIMATES OF EFFECTIVENESS.
- AS WOULD BE EXPECTED, IF WE COMBINE THE AIR CUSHION SYSTEM WITH A MANUAL THREE-POINT SYSTEM, THE RESULTING EFFECTIVENESS VALUES EXCEED THOSE FOR THE MANUAL 3-POINT SYSTEMS BY ABOUT 5 PERCENTAGE POINTS AT EACH INJURY SEVERITY LEVEL CONSIDERED.
- AT FIRST GLANCE, THE SUGGESTED LEVEL OF IMPROVEMENT FOR THE COMBINED SYSTEM MAY SEEM PESSIMISTIC. THIS MAY WELL PROVE TO BE THE CASE.
- HOWEVER, ONE ALSO NEEDS TO CONSIDER THAT THE MAJORITY OF FACTORS WHICH CURRENTLY ACT TO LIMIT THE EFFECTIVENESS OF MANUAL 3-POINT SYSTEMS, SUCH AS COMPARTMENT INTRUSION AND REAR SEAT PASSENGER LOADING, WILL ALSO ACT AS LIMITING FACTORS TO THE PROTECTION AFFORDED BY SUCH A COMBINED SYSTEM.

PRESENTATION

PUBLIC FORUM ON OCCUPANT RESTRAINTS

RESEARCH AND DEVELOPMENT PORTION

SLIDE #4 : DYNAMIC TESTING

- THE PREVIOUS AUTOMATIC RESTRAINT EFFECTIVENESS ESTIMATES IMPLY NO NET IMPROVEMENT OVER MANUAL 3-POINT SYSTEMS IS ANTICIPATED BY THE IMPOSITION OF THE DYNAMIC PERFORMANCE REQUIREMENTS TO WHICH AUTOMATIC RESTRAINT SYSTEMS ARE SUBJECT.

- THIS SHOULD NOT BE INTERPRETED AS A STATEMENT OF THE MERITS OF DYNAMIC TESTING, BUT RATHER, ON THE INADEQUACY OF EXISTING INJURY CRITERIA.

- THE DEPARTMENT BELIEVES THAT DYNAMIC TESTING OFFERS THE PREFERRED MEANS OF ENSURING GREATER UNIFORMITY IN PERFORMANCE BOTH BETWEEN RESTRAINT SYSTEMS OF SIMILAR DESIGN AND BETWEEN RESTRAINT SYSTEMS WHICH FOLLOW COMPLETELY DIFFERENT DESIGN PHILOSOPHIES.

- DYNAMIC TESTING ALSO OFFERS THE ADVANTAGE OF GREATLY REDUCING THE NUMBER OF DESIGN-RESTRICTIVE REQUIREMENTS TO WHICH RESTRAINT SYSTEMS ARE CURRENTLY SUBJECT.

- THE FORMULATION OF A MORE COMPREHENSIVE SET OF PERFORMANCE CRITERIA WHICH COULD BE APPLIED IN A DYNAMIC TEST OF A VEHICLE TO ASSESS FRONTAL CRASH PROTECTION HAS BEEN, AND CONTINUES TO BE, THE SUBJECT OF INTENSE STUDY BY THE DEPARTMENT.

SLIDE #5 :

- THE MORE SPECIFIC OBJECTIVES OF THIS PROGRAMME ARE SUMMARIZED IN THE ACCOMPANYING SLIDE.

- THE DEPARTMENT HAS AND CONTINUES TO MAINTAIN SERIOUS RESERVATIONS WITH RESPECT TO THE USE THE EXISTING HEAD INJURY CRITERION OR "HIC" AS IT IS MORE COMMONLY REFERRED TO.

- THE EXTENT TO WHICH MEANINGFUL ASSESSMENTS OF CLOSED HEAD INJURY POTENTIAL CAN BE SUPPORTED ON THE BASIS OF THIS CRITERION IS OPEN TO QUESTION. FEW WOULD DISAGREE, HOWEVER, THAT THIS CRITERION OFFERS LITTLE , IF ANY, BENEFIT IN THE SUPPORT OF FACIAL INJURY ASSESSMENT.

- WE ALSO BELIEVE THAT A CHEST DEFLECTION-BASED CRITERION OFFERS A MORE RATIONAL MEANS OF ASSESSING CHEST INJURY POTENTIAL THAN DOES THE EXISTING ACCELERATION CRITERION OF 60 G. AS SUCH WE FAVOUR THE USE OF THE G.M. HYBRID III CRASH TEST DUMMY OVER THE EXISTING PART 572 DUMMY, AS THE HYBRID III PROVIDES THE CAPABILITY OF MONITORING THE DEFLECTION OF THE RIB CAGE AT LEAST AT THE MID-STERNUM.

- FOR THIS AND SEVERAL OTHER REASONS RELATED TO BIOFIDELITY, THE HYBRID III WAS SELECTED TO SERVE AS A BASIS FOR THE DUMMY-RELATED PORTIONS OF OUR RESEARCH PROGRAMME.

- BELT-INDUCED ABDOMINAL INJURIES AMONG FRONT SEATED OCCUPANTS RESTRAINED BY 3-POINT MANUAL SEAT BELTS ARE INFREQUENT. HOWEVER, WHEN THEY DO OCCUR, THE INJURIES ARE INVARIABLY SERIOUS, AND FREQUENTLY LIFE-THREATENING. FOR THIS REASON, CONSIDERABLE EFFORT HAS BEEN EXPENDED IN THE PRESENT RESEARCH PROGRAMME ON THE QUESTION OF PROPER BELT FIT, PARTICULARLY WITH RESPECT TO LAP BELTS.

- HARDWARE :

- TO DATE OUR RESEARCH EFFORTS HAVE PRODUCED TWO TEST DEVICES WHICH ARE IN THE FINAL STAGES OF DEVELOPMENT.

- THE FIRST OF THESE IS A MODIFIED HYBRID III HEAD FORM WHICH INCORPORATES A FRANGIBLE FACIAL INSERT. THE INSERT IS FORMED FROM A MATERIAL WHOSE CHARACTERISTICS ARE SIMILAR TO THAT OF BONE, AND THE UNIT HAS BEEN DESIGNED TO FRACTURE AT IMPACT ENERGY LEVELS COMPARABLE TO THOSE OBSERVED TO CAUSE FACIAL FRACTURES IN CADAVER STUDIES.

- THE SECOND DEVICE DEVELOPED IS THE BELT FIT TEST DEVICE. THE LATTER DEVICE CONSISTS OF A STANDARD H-POINT MACHINE WHICH HAS BEEN MODIFIED TO ACCEPT A LAP FORM AND A CHEST FORM. BOTH FORMS INCORPORATE SCALES WHICH ALLOW THE POSITION OF A SEAT BELT TO BE QUANTIFIED ON THE BASIS OF A SIMPLE STATIC IN-VEHICLE TEST.

- BOTH DEVICES ARE ON DISPLAY

-SLIDE #6: HEAD/FACIAL INJURY

- I WILL NOW REVIEW THE VARIOUS SPECIFIC INJURY OR PERFORMANCE CRITERIA PRESENTLY UNDER CONSIDERATION BY THE DEPARTMENT.

- IN THE SHORT TERM TWO REGULATORY OPTIONS ARE PRESENTLY UNDER REVIEW BY THE DEPARTMENT TO SUPPORT THE ASSESSMENT OF HEAD AND FACIAL INJURY POTENTIAL IN THE CONTEXT OF A 48 KM/HR BARRIER CRASH. BOTH WOULD BE BASED ON THE HYBRID III CRASH TEST DUMMY.

- THE FIRST OF THESE WOULD SIMPLY LIMIT THE MAXIMUM PERMISSIBLE RESULTANT CENTROIDAL ACCELERATION OF THE HEAD TO 80 G'S.

- THE SECOND OPTION UNDER CONSIDERATION IS TO ADOPT THE LATEST VARIANT OF HIC IN COMBINATION WITH A FACIAL FRACTURE CRITERION BASED ON THE FRANGIBLE INSERT.

- BOTH OF THE ABOVE OPTIONS ARE INTENDED TO SERVE AS INTERIM CRITERIA FOR HEAD INJURY ASSESSMENT UNTIL SUCH TIME AS A MORE COMPLETE CRITERION CAN BE FORMULATED WHICH TAKES INTO ACCOUNT BOTH TRANSLATIONAL AND ROTATIONAL COMPONENTS OF ACCELERATION. AT PRESENT THE REQUIRED BIOMECHANICAL DATA WHICH WOULD SUPPORT SUCH A CRITERION ARE SIMPLY NOT AVAILABLE.

SLIDE #7 : - CHEST

- THE U.S. DEPARTMENT HAS RECENTLY ISSUED AN ALTERNATIVE SET OF CHEST DEFLECTION CRITERIA FOR USE IN CONJUNCTION WITH THE HYBRID III CRASH TEST DUMMY. THE DEPARTMENT BELIEVES THE PROPOSED LIMITS ARE REASONABLE AND ACHIEVABLE AND IS PREPARED TO ACCEPT THEM.

- ESSENTIALLY THEY WOULD LIMIT THE MAXIMUM DEFLECTION OF THE CHEST TO 50 MM IN THE CASE OF SEAT BELT SYSTEMS AND 75 MM IN THE CASE OF AIR CUSHIONS.

SLIDE #8 : ABDOMEN/FEMUR

- OVER THE COURSE OF THE NEXT YEAR, THE DEPARTMENT WILL BE FINALIZING THE PERFORMANCE CRITERIA ASSOCIATED WITH THE BELT FIT TEST DEVICE.

- TO ASSIST US IN THIS PROCESS A SERIES FOUR BELT FIT CONVERSION KIT HAVE BEEN FABRICATED AND ARE CURRENTLY BEING MADE AVAILABLE TO OTHER GOVERNMENT AGENCIES AS WELL AS VEHICLE MANUFACTURES FOR THEIR ASSESSMENT AND COMMENTS. THEIR RESPONSES AND RECOMMENDATIONS WILL BE TAKEN INTO ACCOUNT IN THE FORMULATION OF THE FINAL CRITERIA.

- WITH RESPECT TO LOWER LEG INJURY ASSESSMENT, WE BELIEVE THE EXISTING FEMUR COMPRESSION FORCE LIMIT OF 10,000 NEWTONS IS REASONABLE AND IT WILL VERY LIKELY BE RETAINED IN ANY FUTURE REQUIREMENTS.

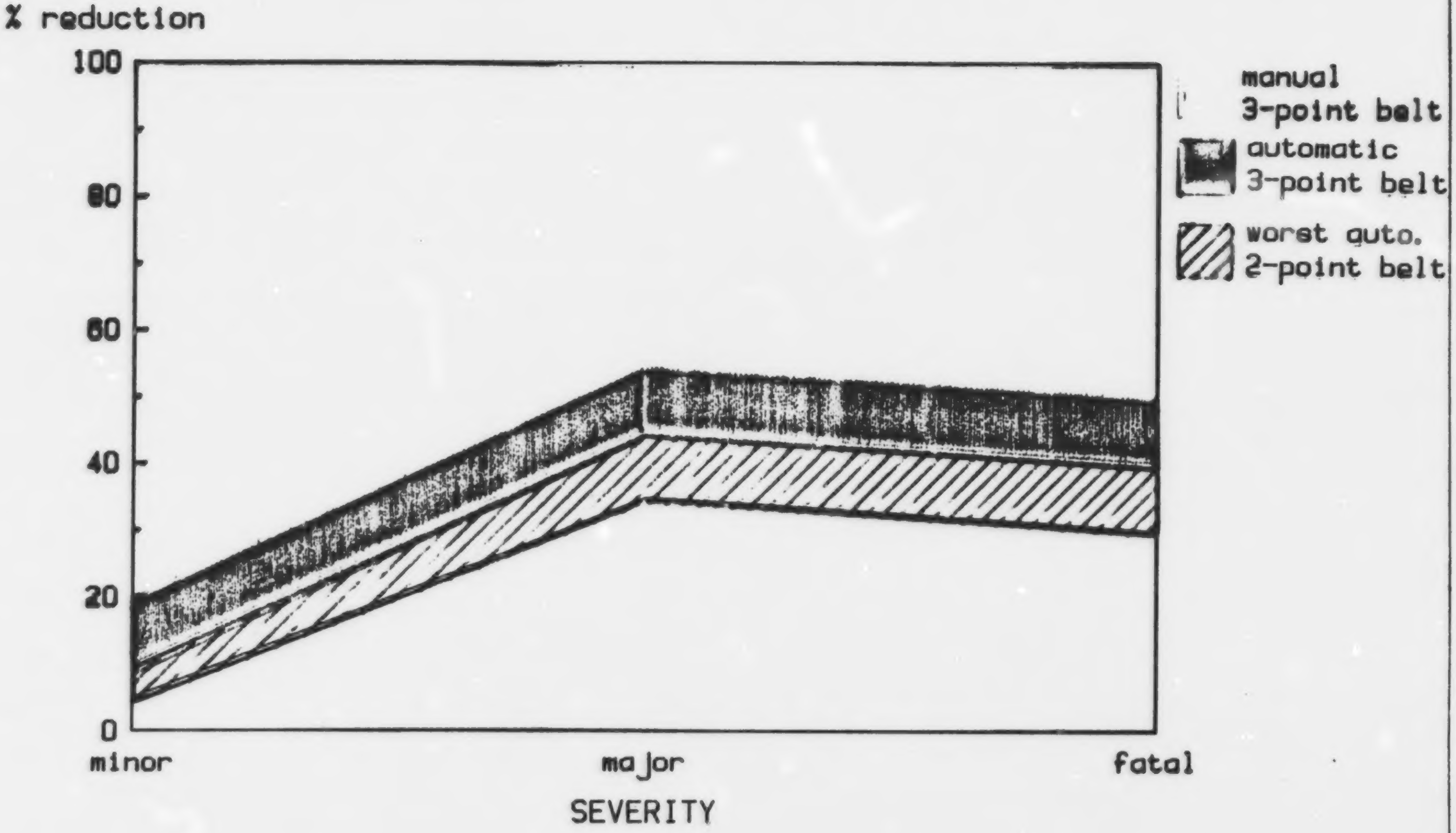
RESTRAINT SYSTEM EFFECTIVENESS

EFFECTIVENESS - DENOTES THE REDUCED LIKELIHOOD OF BEING INJURED WHILE RESTRAINED COMPARED TO BEING UNRESTRAINED.

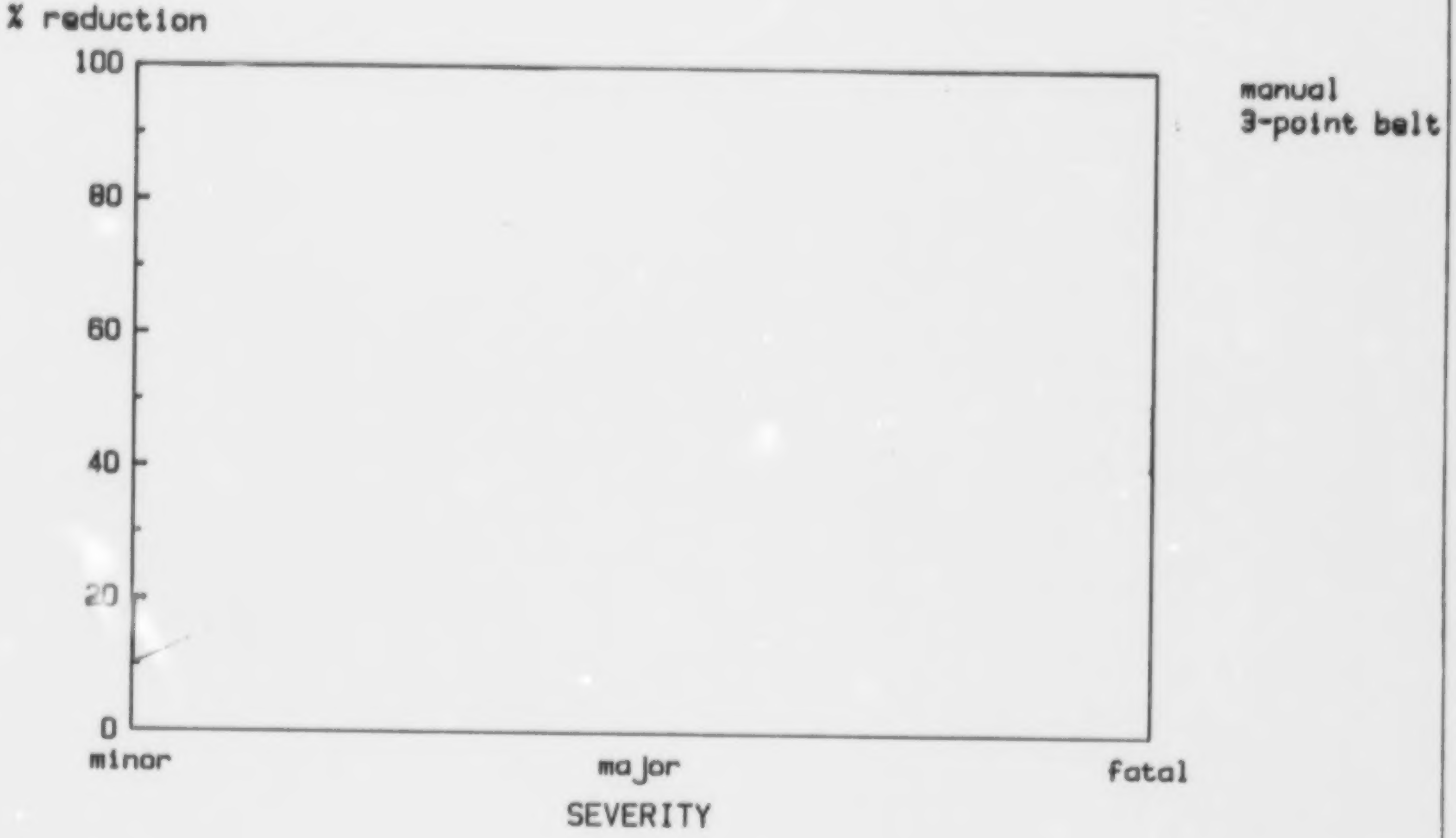
INJURY SEVERITY LEVELS
- FATAL
- AIS 2-5 (MAJOR)
- AIS 1 (MINOR)

EFFECTIVENESS INTERVALS - WIDTH OF INTERVAL REFLECTS DEGREE OF UNCERTANTY REGARDING ACTUAL LEVEL OF PERFORMANCE LIKELY TO BE REALIZED.

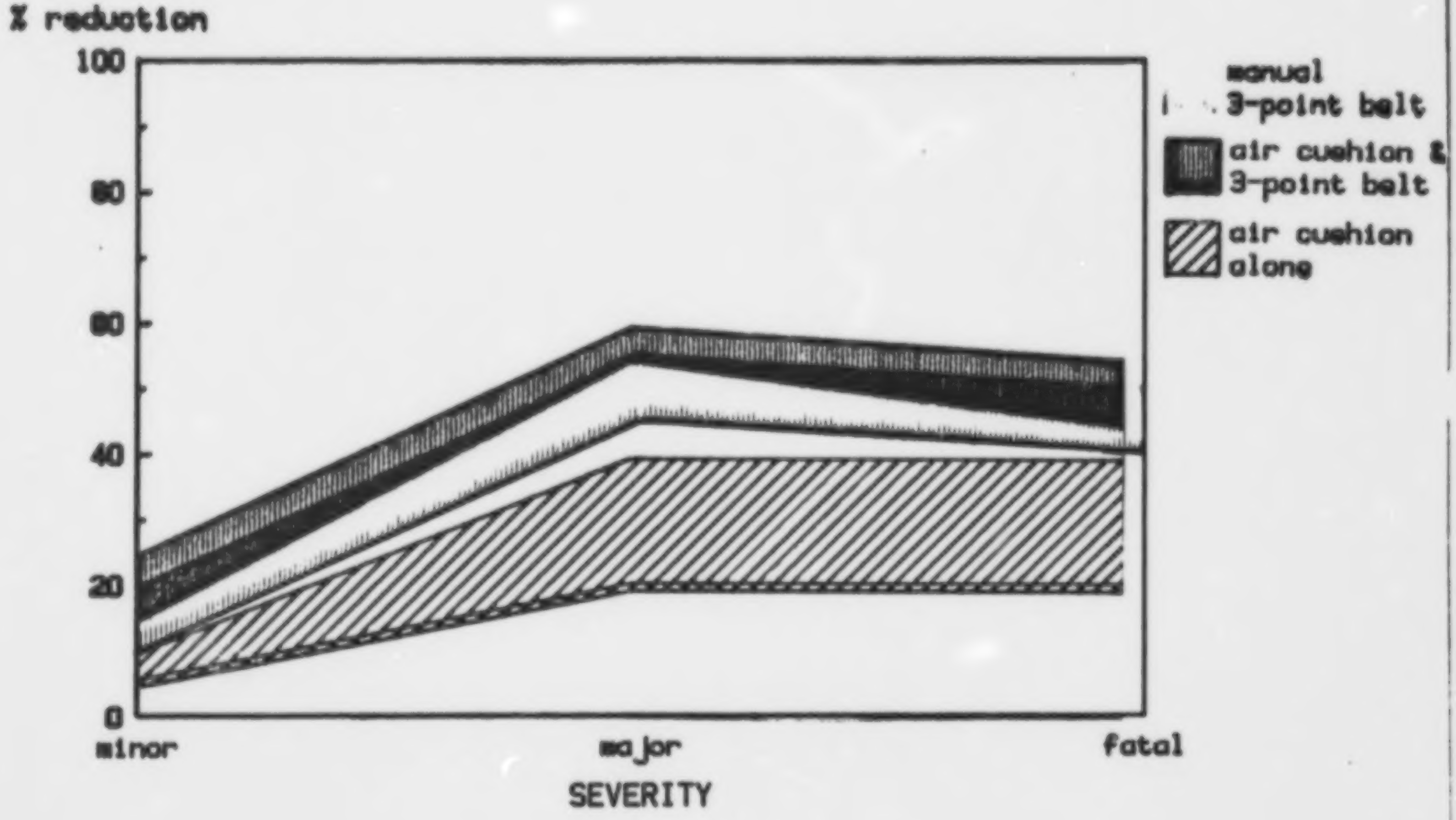
REDUCTION IN LIKELIHOOD OF CASUALTY FROM RESTRAINT SYSTEM USE



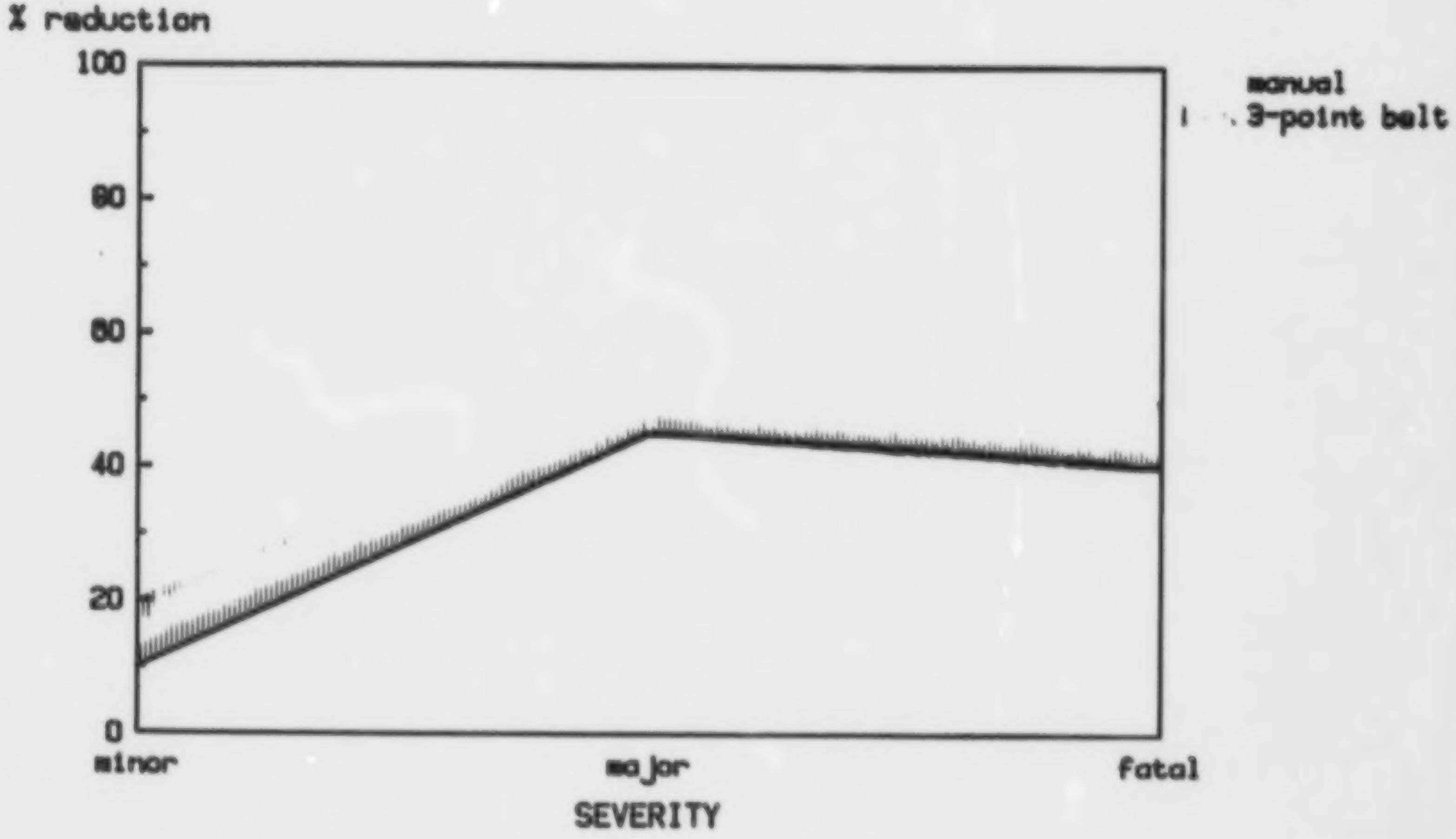
REDUCTION IN LIKELIHOOD OF CASUALTY FROM RESTRAINT SYSTEM USE



REDUCTION IN LIKELIHOOD OF CASUALTY FROM RESTRAINT SYSTEM USE



REDUCTION IN LIKELIHOOD OF CASUALTY FROM RESTRAINT SYSTEM USE



IMPROVED OCCUPANT PROTECTION CRITERIA STUDY

OVERALL OBJECTIVES :

- UPGRADE TECHNICAL BASIS OF CMVSS 208
- ENSURE GREATER UNIFORMITY OF PERFORMANCE
- UNIFORM SET OF DYNAMIC TEST REQUIREMENTS FOR ALL OCCUPANT RESTRAINT SYSTEMS
- REDUCTION IN THE NUMBER OF DESIGN-RESTRICTIVE REQUIREMENTS

IMPROVED OCCUPANT PROTECTION CRITERIA STUDY

SPECIFIC OBJECTIVES :

- ALTERNATIVE CLOSED HEAD INJURY CRITERION TO HIC
- FACIAL INJURY CRITERION
- DEFLECTION-BASED CRITERION FOR THE CHEST
- PERFORMANCE REQUIREMENTS TO MINIMIZE RISK OF BELT-INDUCED ABDOMINAL INJURY

UNIQUE TEST HARDWARE :

- MODIFIED HYBRID III HEAD FORM
- BELT FIT TEST DEVICE (BTD)

PERFORMANCE CRITERIA

BODY REGION	DESCRIPTION
	SHORT TERM:
HEAD & FACE	- RESULTANT C.G. TRANSLATIONAL ACCELERATION OF THE HEAD NOT TO EXCEED 80 G ; OR - HIC <= 1000 IN ASSOCIATION WITH A FACIAL FRACTURE CRITERION BASED ON FRANGIBLE INSERT.
	LONG TERM:
HEAD	- LIMITS ON TRANSLATIONAL AND ROTATIONAL COMPONENTS OF ACCELERATION, SEPARATELY AND IN COMBINATION.

PERFORMANCE CRITERIA (CONT)

BODY REGION	DESCRIPTION
CHEST	- MAXIMUM CHEST COMPRESSION LIMIT,
	50 MM - SYSTEMS INCORPORATING UPPER TORSO BELT,
	75 MM - AIR BAG ONLY SYSTEMS.

PERFORMANCE CRITERIA (CONT)

BODY REGION	DESCRIPTION
ABDOMEN	- SEAT BELT FIT SCORE BASED ON BELT FIT TEST DEVICE (BTD).
FEMUR	- MAXIMUM COMPRESSION FORCE LIMIT OF 10K NEWTONS (EXISTING REQUIREMENT).

PRESENTATION OF JOHN LAWSON, TRANSPORT CANADA

COST-EFFECTIVENESS OF ALTERNATIVE OCCUPANT RESTRAINT OPTIONS

SLIDE 1

The graph shows annual front-sear car fatalities resulting from manual belt use at current (60%) levels and its total potential with 100% belt use; and also shows the potential for the air bag by showing the two extreme cases of ACRS with no supplemental belt use and ACRS plus 100% belt use.

The trends are calculated using a 2% increase in vehicle-kilometres travelled over time, and no change in risks. Fatalities in the 60% belt use base case therefore begin at the expected 1986 level of 2,080 and increase by 2% p.a. to 3,350 in the year 2010.

Achieving 100% manual belt use could produce a reduction of about 900 deaths a year, and is shown here being feasible by 1988. Over the period to 2010, the cumulative possible savings would be 17,000.

The air bag potential is shown as growing from introduction in 1988, assuming all new vehicles could be equipped from that year. The ACRS alone could produce savings growing to 200 deaths per year fewer than existing manual belt use, and a cumulative total of 3,000 by the year 2010. The upper limit of ACRS potential, with 100% belt use, could achieve savings growing to 1,100 deaths per year compared to 60% manual belt use, with a cumulative total of 16,000 by the year 2010 (which is slightly less than the cumulative reductions possible with 100% manual belt use, due to the time taken for the ACRS to be available for all vehicles in the fleet).

SLIDE 2

This shows the equivalent projections for front-seat car occupants injured with the various systems.

60% manual belt use would produce a total of about 4.3 million injured victims in total up to the year 2010. 100% manual belt use could bring cumulative reductions of 440,000 victims in that period. By comparison, the ACRS potential would be between the extremes of producing a cumulative increase in injuries of 40,000 victims if no manual belt use accompanied the ACRS, and a cumulative saving of 530,000 victims if belts were used 100% with ACRS.

SLIDE 3

For the relative cost-benefit analysis of the alternatives, these values of avoiding deaths and injuries are used. In estimating these values, it is recognised that they count only the immediately-obvious material costs of accidents, and are therefore partial values which give minimum estimates.

Such minimum estimates can be useful in clearly showing safety measures are worthwhile, if these minimum values outweigh the costs. But they cannot deny clearly that a measure is worthwhile. They might then only give a rough indication of the relative cost-effectiveness of alternative measures.

SLIDE 4

Looking first at automatic belts, this graph portrays money benefits and costs of the systems in dollars per vehicle-lifetime.

The range of benefits represents the estimates from the most to the least effective systems, as presented earlier by Mr. Dalmotas. The benefits begin only if automatic belts encourage belt use beyond that achieved with current manual systems. They are therefore shown over the range of increased use from 0% to 40%, equivalent to use of the automatic systems from 0% to 100% if manual belt use otherwise remained at 60%.

It can be seen that the benefit ranges from zero up to between $75 and $150 per vehicle at an additional 40% use.

Overlaying on this the expected cost of an automatic belt, of $80 per vehicle-lifetime, it is shown that such a cost outweighs the money value of the benefit up to about 25% additional belt use, when the most-effective automatic belts would become clearly cost-beneficial. The least-effective belt systems could never achieve that.

SLIDE 5

This slide portrays the benefits and costs of the full-front ACRS per vehicle-lifetime in similar fashion. First the range of benefits is shown, based on the range of effectiveness in Mr. Dalmotas' estimates, and on supplemental seat belt use varying from 0% to 100%.

With no supplemental belt use, the slide shows estimated benefits with zero belt use varying from negative by about $20 per vehicle up to about $50 per vehicle, and with average effectiveness giving about $20 per vehicle. The benefit would climb as belt use increased, reaching $160-200 per vehicle-lifetime if 100% belt use with ACRS could be achieved.

The overlay shows our best estimate of $400 per vehicle as the lifetime cost of an ACRS, outweighing the (minimum) estimated benefit substantially whatever the supplemental belt use.

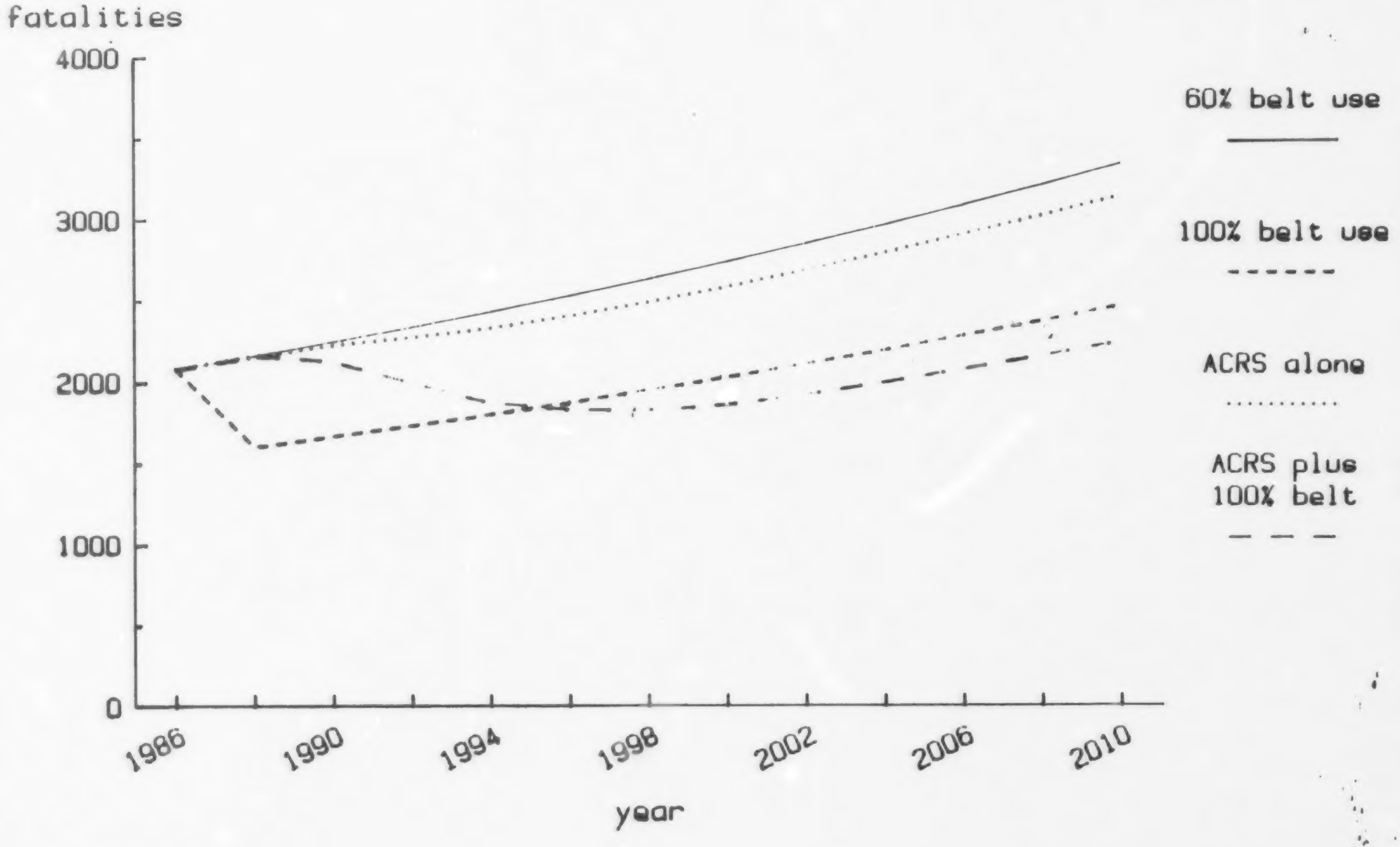
SLIDE 6

This shows the equivalent estimates for a driver-side ACRS. Benefits are projected at 70% of those of a full-frontal ACRS, starting at between about -$15 and $40 per vehicle with no supplemental belt use, and reaching between $110 and $140 per vehicle with 100% supplemental belt use.

The overlay shows that the cost is forecast as (at least) $150 per vehicle, outweighing the projected minimum benefit at any level of supplemental belt use.

PRESENTATION OF
JOHN LAWSON,
TRANSPORT CANADA

FRONT-SEAT CAR OCCUPANT FATALITIES
1985-2010

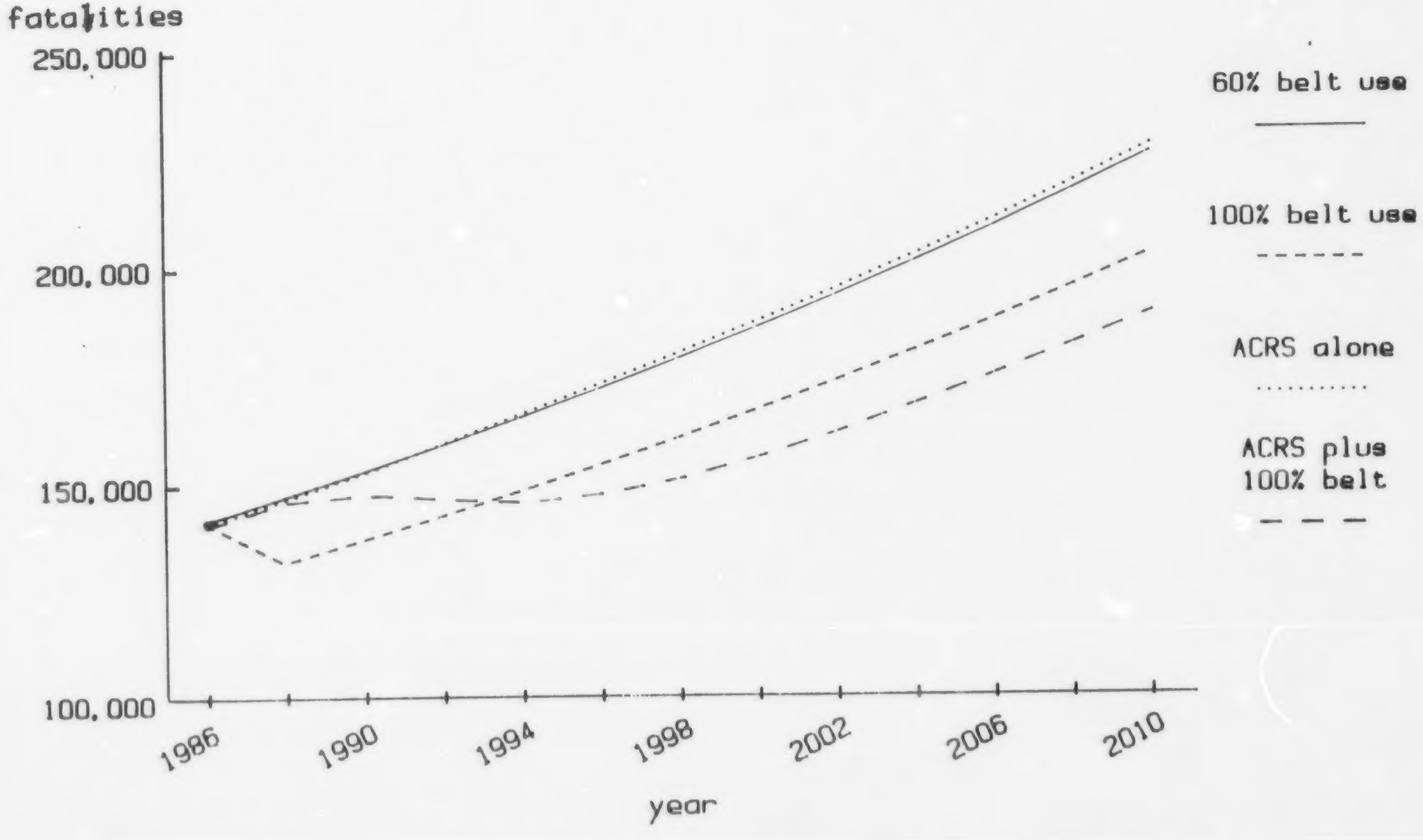


3350) 2.
3150

2500) 25
2250

Agg F:
Current : 65
100% : ↓ 17
ACRS alone ↓ 3
ACRS/100% ↓ 1

FRONT-SEAT CAR OCCUPANTS INJURED
1986-2010



226,00
223,0

200,0
188,00

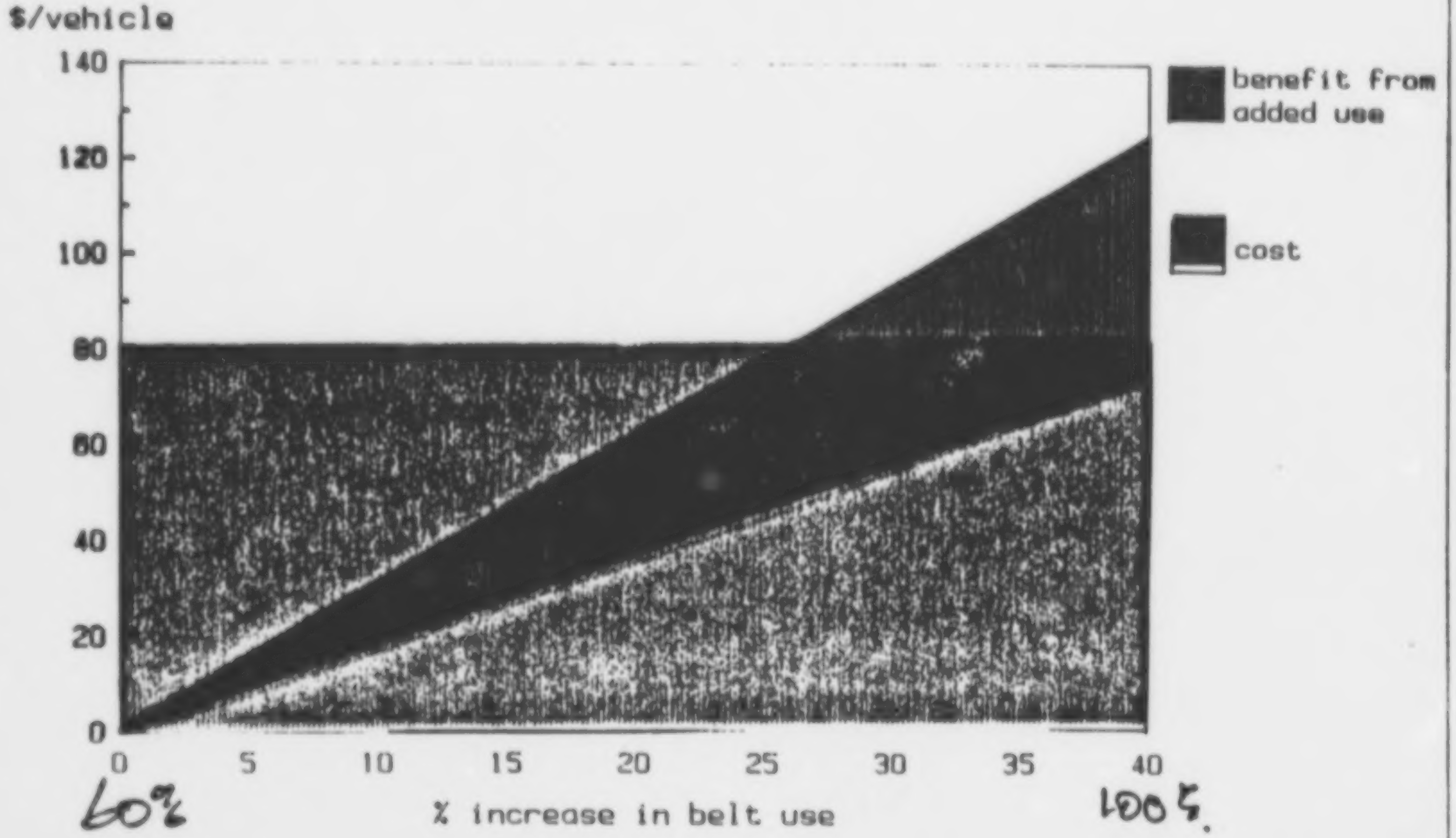
Agg

Current
100% belt
ACRS ↑
ACRS/belt

MINIMUM VALUES PER :

- *FATALITY AVOIDED – $260,000*
- *INJURY AVOIDED – $3,000*

COST-EFFECTIVENESS OF AUTOMATIC BELTS



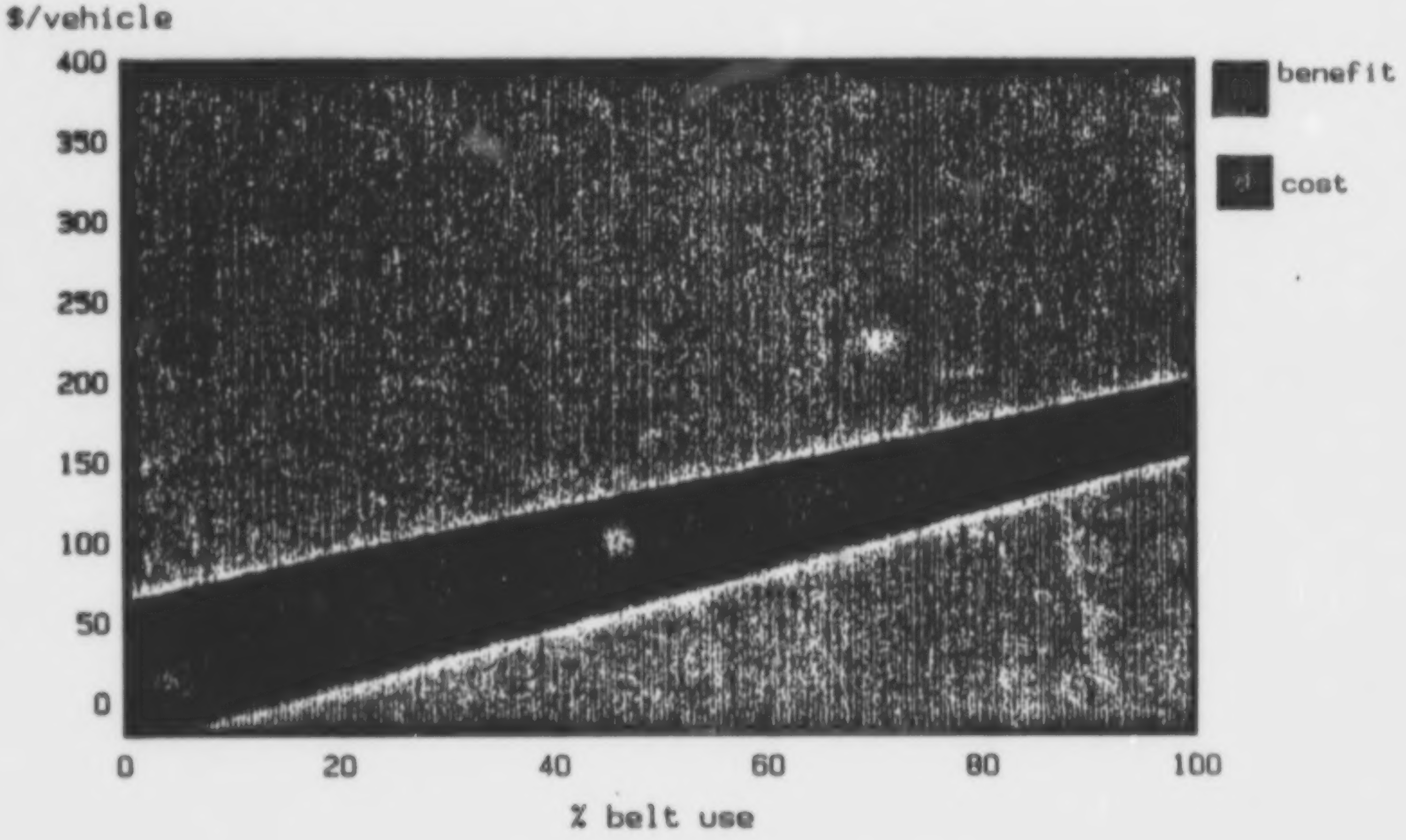
≈ 125

75

60%

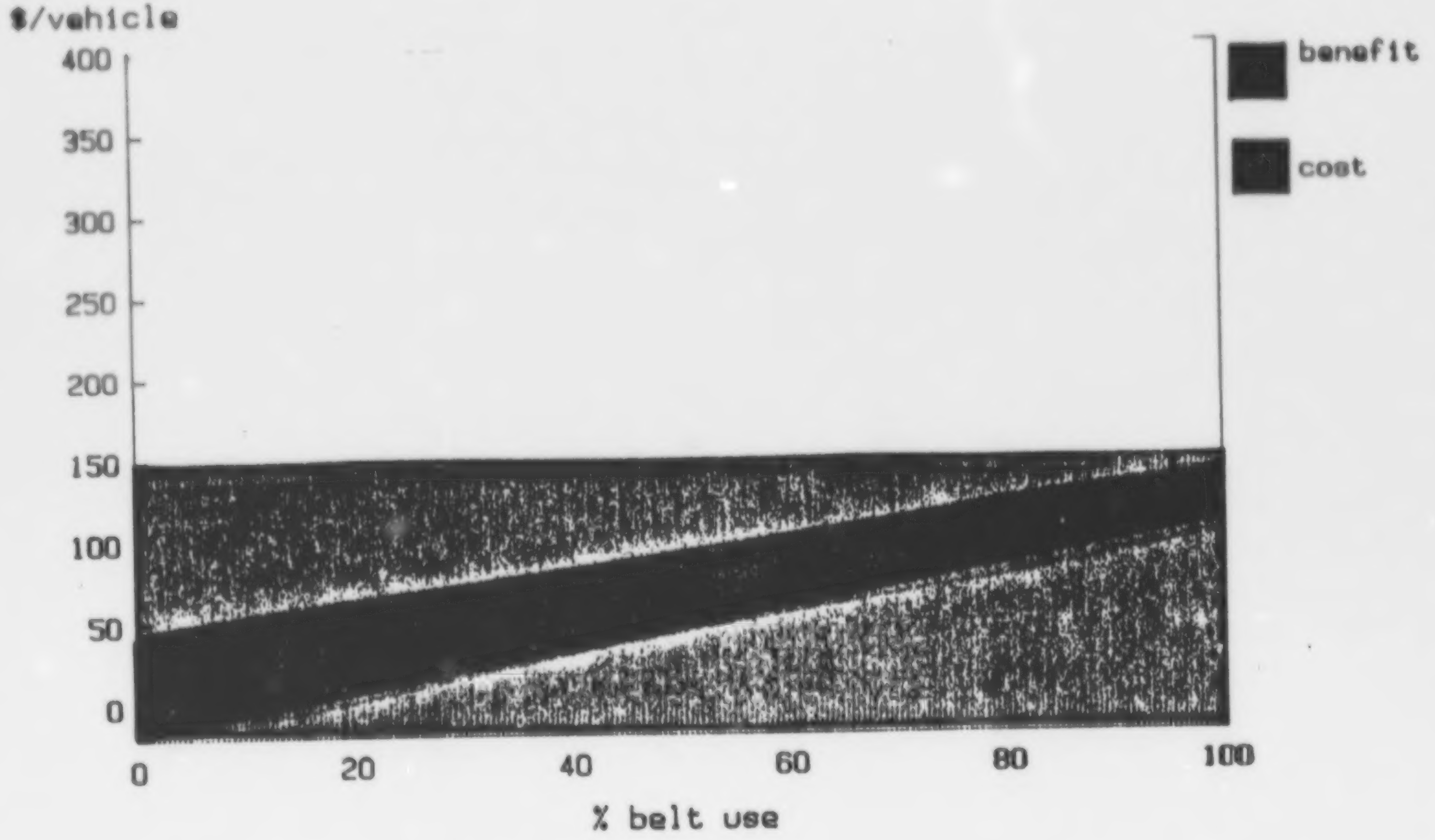
100%.

COST-EFFECTIVENESS OF AIR BAGS
- FULL FRONT SEAT



200
160

COST-EFFECTIVENESS OF AIR BAGS
DRIVER SIDE ONLY



40
-15

PRESENTATION OF MR. RALPH HITCHCOCK
U.S. DEPARTMENT OF TRANSPORTATION

COST IMPACTS-AUTOMATIC RESTRAINT SYSTEMS

CURRENT ECONOMICS

RETAIL PRICE INCREMENTS (PRODUCTION VOLUMES)	U.S.	CANADIAN
MANUAL BELTS	BASE	BASE
AUTOMATIC BELTS-UNPOWERED	45.00	$59.00
AIR BAG-DRIVER ONLY	$250.00	$328.00
AIR BAG-FULL FRONT	$364.00	$477.00
AIR BAG-FULL FRONT WITH SHOULDER BELTS	$398.00	$508.00

LIFETIME ENERGY COSTS	WEIGHTS PRIMARY	 SECONDARY	 TOTAL		
	LBS	LBS	LBS		
PRICE PER GALLON				$0.93	
MANUAL BELTS	BASE	BASE	BASE	BASE	
AUTOMATIC BELTS-UNPOWERED	5.00	5.00	10.00	$9.00	$12.00
AIR BAG-DRIVER ONLY	5.00	5.00	10.00	$9.00	$12.00
AIR BAG-FULL FRONT	21.00	21.00	42.00	$38.00	$50.00

LIFETIME COST IMPACTS		
MANUAL BELTS	BASE	BASE
AUTOMATIC BELTS-UNPOWERED	$54.00	$71.00
AIR BAG-DRIVER ONLY	$259.00	$339.00
AIR BAG-FULL FRONT	$402.00	$527.00
AIR BAG-FULL FRONT WITH SHOULDER BELTS	$426.00	$558.00

REMARKS

A. CURRENT MANUAL BELT SYSTEMS FOR FRONT SEATSONLY ARE ESTIMATED TO COST $69 U.S.,$90 CANADIAN

B. THE ABOVE AIR BAG COSTS DO NOT REFLECT THE SHARP DECLINE IN THE COST OF ELECTRONIC COMPONENTS OVER THE LAST THREE YEARS.

C. CURRENT EXCHANGE RATE :U.S.$/CANADIAN $=1.31

AIR BAG COSTS		U.S. $ 1982	CPI ALL ITEMS	U.S. $ 1986	EXCHANGE RATE	CANADIAN $ 1986
DRIVER AND TWO PASSENGERS:						
ELECTRONICS						
SENSORS	$37.00					
DIAGNOSTIC MODULE	$26.00	$63.00	1.136	$71.57	1.31	$93.75
DRIVER & PASSENGER MODULES		$124.00	1.136	$140.86	1.31	$184.53
VEHICLE MODIFICATIONS		$25.00	1.136	$28.40	1.31	$37.20
TOTAL VARIABLE COST		$212.00	1.136	$240.83	1.31	$315.49
FIXED COSTS,OTHER COSTS+ PROFIT		$70.00	1.136	$79.52	1.31	$104.17
DEALER MARK-UP		$38.00	1.136	$43.17	1.31	$56.55
RETAIL PRICE TO BUYER		$320.00	1.136	$363.52	1.31	$476.21

ANNEX III: PRESENTATION OF BRIEFS - SESSION II

ANNEXE III: COMMUNICATIONS DES MÉMOIRES - SÉANCE II

CANADA SAFETY COUNCIL

presentation to:

PUBLIC FORUM ON OCCUPANT RESTRAINTS

OTTAWA, ONTARIO

MARCH 25-26, 1987

sponsored by

TRANSPORT CANADA'S

ROAD SAFETY AND MOTOR VEHICLE REGULATION DIRECTORATE

remarks by Randy McLean, Transportation Safety Manager

ON BEHALF OF THE CANADA SAFETY COUNCIL, I WANT TO THANK TRANSPORT CANADA'S ROAD SAFETY DIRECTORATE, DR. CAMPBELL AND HIS STAFF, FOR CONVENING THIS FORUM. THIS FORUM IS IMPORTANT NOT ONLY IN TERMS OF THE VALUABLE TECHNICAL INFORMATION PRESENTED - BUT ALSO, AND PERHAPS MORE IMPORTANTLY, BECAUSE IT BRINGS SO MANY DIFFERENT GROUPS TOGETHER AND DEMONSTRATES HOW MANY AGENCIES, MANUFACTURERS, ASSOCIATIONS, ETC. HAVE AN INTEREST IN HIGHWAY SAFETY.

THE REMARKS I HAD PREPARED FOR TODAY BASICALLY REITERATED THE CANADA SAFETY COUNCIL'S POSITION IN REGARD TO OCCUPANT RESTRAINTS - BUT AS A RESULT OF YESTERDAY'S PRESENTATIONS I WOULD INSTEAD LIKE TO TAKE MY 5 MINUTES TO OFFER SOME COMMENTS FOR YOUR CONSIDERATION.

SUFFICE TO SAY THAT THE CANADA SAFETY COUNCIL WAS ONE OF THE ORIGINAL SUPPORTERS OF MANDATORY SEAT BELT USE LEGISLATION AND CONTINUES TO SUPPORT IMPROVEMENTS TO THE OCCUPANT RESTRAINT SYSTEM. WE ARE A NON-PROFIT, NON-GOVERNMENT NATIONAL SAFETY ORGANIZATION AND IN COOPERATION WITH PROVINCIAL SAFETY COUNCILS AND LEAGUES OUR MANDATE IS TO ENCOURAGE SAFETY IMPROVEMENTS IN THE PUBLIC, OCCUPATIONAL AND TRAFFIC ENVIRONMENTS. FOR THOSE OF YOU NOT FAMILIAR WITH THE COUNCIL, AND PARTICULARLY NOT FAMILIAR WITH OUR HIGHWAY SAFETY PROGRAMS, THERE ARE A LIMITED NUMBER OF INFORMATION FOLDERS AT THE BACK OF THE ROOM.

IN HIS REMARKS YESTERDAY, MR. DAVID KILGOUR, PARLIAMENTARY SECRETARY TO THE MINISTER OF TRANSPORT SAID:

> "OCCUPANT RESTRAINTS ARE ONE OF THE MOST EFFECTIVE SAFETY MEASURES IN REDUCING DEATH AND INJURY IN AUTOMOBILE ACCIDENTS"

HE WENT ON TO SAY THAT:

> "HAVING THE SYSTEMS INSTALLED IN THE AUTOMOBILE IS ONLY THE FIRST STEP - THEY MUST BE WORN EACH AND EVERY TIME".

.../2

THAT IS THE ISSUE WE ARE ADDRESSING.

UNFORTUNATELY, AND MY FIRST CONCERN, IS THAT ALMOST ALL OF THE DISCUSSIONS TO DATE ABOUT OCCUPANT RESTRAINT SYSTEMS HAVE TO A LARGE EXTENT IGNORED THE HUMAN ELEMENT. IT'S AS IF THE OCCUPANT IS NOT PART OF THE OCCUPANT RESTRAINT SYSTEM. IT WOULD APPEAR THAT WE BELIEVE THAT THE TECHNOLOGY - BE IT TWO POINT BELTS, THREE POINT BELTS OR SOME OTHER MECHANISM - IS WONDERFUL AND MIGHT WORK TO PERFECTION, IF ONLY WE COULD GET THAT DAMN SILLY HUMAN OUT OF THE MIDDLE, BECAUSE HE/SHE KEEPS MESSING THINGS UP.

WE SUPPORT TECHNOLOGY AND IMPROVEMENTS TO TECHNOLOGY - VERY FEW THINGS SHOULD REMAIN STATIC. IF IT CAN BE IMPROVED AT A REASONABLE COST THEN LET'S DO IT. BUT WE SHOULD NOT LOSE SIGHT OF THE IMPORTANCE OF THE HUMAN CONTRIBUTION TO THE SYSTEM.

AUTOMATIC BELTS AND AIR BAGS WERE ORIGINALLY CONCEIVED AS FAIL SAFE DEVICES FOR DRIVERS WHO DO NOT, OR WILL NOT, WEAR MANUAL SEAT BELTS. --- IF SEAT BELTS ARE AS EFFECTIVE AS WE ALL BELIEVE THEM TO BE - WHY CAN'T WE CONVINCE MORE OF THE PUBLIC TO WEAR THEM? THE PROBLEM MAY NOT BE THE DUMB DRIVER WHO REFUSES TO WEAR A SEAT BELT, IT MAY BE THAT WE - DO NOT PRESENT OUR ARGUMENTS VERY CONVINCINGLY - OR THAT WE DON'T PRESENT THE RIGHT ARGUMENTS- OR THAT WE SPEND TOO MUCH OF OUR TIME PREACHING TO THE CONVERTED.

A LEGITIMATE QUESTION IS 'CAN WE IMPLEMENT OUR POLICIES MORE EFFECTIVELY?'

THE FORD CANADA PRESENTATION YESTERDAY TALKED ABOUT 'NET EFFECTIVENESS' AS THE PRODUCT OF SYSTEM EFFECTIVENESS AND SYSTEM USE. SYSTEM EFFECTIVENESS IS RELATIVELY CONSTANT FOR A GIVEN RESTRAINT SYSTEM AND CRASH CONFIGURATION, BUT 'SYSTEM USE' IS A DYNAMIC VARIABLE THAT WE CAN INFLUENCE.

.../3

TRANSPORT CANADA'S BACKGROUND REPORT ON OCCUPANT RESTRAINTS STATES THAT:

> "THERE IS NO EVIDENCE THAT PUBLIC EDUCATION PROGRAMS ALONE HAVE HAD ANY IMPACT ON THE ACTUAL USE OF SEAT BELTS"

WE AGREE THAT PUBLIC EDUCATION ALONE IS NOT THE SOLUTION. BUT THE BACKGROUND REPORT GOES ON TO NOTE THAT, IN CONJUNCTION WITH ENFORCEMENT AND LEGISLATION, - EDUCATION HAS PROVEN EFFECTIVE IN BRITISH COLUMBIA AND MORE RECENTLY IN NOVA SCOTIA WHICH HAS ACHIEVED AN 80% USE RATE FOR TWO CONSECUTIVE YEARS.

TRANSPORT CANADA'S BACKGROUND REPORT ALSO STATES THAT ONE OF THE PROBLEMS WITH PUBLIC EDUCATION IS THAT LITERALLY MILLIONS OF DOLLARS ARE REQUIRED TO MOUNT AN EFFECTIVE MEDIA CAMPAIGN. I HAVE TWO COMMENTS IN REGARD TO THAT STATEMENT. FIRST, IF WE CONSIDER AIR BAGS AS AN ALTERNATIVE, AT A COST OF ABOUT $500 EACH, FOR A DRIVER'S SIDE ONLY INSTALLATION, ON A MINIMUM PRODUCTION OF 100,000 - 200,000 VEHICLES, THE COST IS $50 TO $100 MILLION DOLLARS. $50 - $100 MILLION DOLLARS, THAT WOULD BY ALOT OF PUBLIC EDUCATION. SECOND, THE STATEMENT MIGHT SUGGEST THAT MASS MEDIA IS THE MOST EFFECTIVE WAY TO REACH A LARGE AUDIENCE. FOR ANY SINGLE ORGANIZATION THAT MIGHT BE TRUE BUT EACH OF US HERE TODAY REPRESENTS NOT ONLY HIS OR HER OWN ORGANIZATION BUT A NETWORK OF SAFETY CONTACTS. THE POTENTIAL SYNERGY THAT EXISTS HERE TODAY IS ENORMOUS. COLLECTIVELY, THERE IS ENOUGH PERSUASIVE POWER IN THIS ROOM ALONE TO ACHIEVE AN 80%, IF NOT 90%, SEAT BELT USE RATE. BUT THE KEY IS IN WORKING TOGETHER.

I HOPE THAT WHEN YOU REVIEW YOUR NOTES FROM THIS FORUM, YOU LOOK NOT ONLY AT THE TECHNICAL DATA THAT HAS BEEN PRESENTED BUT ALSO CONSIDER THE VALUE OF THE POTENTIAL SAFETY INFORMATION NETWORKS THAT EXIST IN THE PERSONS ADJACENT AND SURROUNDING YOU.

.../4

FINALLY, AND PERHAPS MOST IMPORTANTLY, THE BACKGROUND REPORT STATES:

> "IF THERE WERE A FIVE YEAR NATIONAL COMMITMENT TO ENCOURAGE SEAT BELT USE THROUGH THE MEASURES NOTED ABOVE, SEAT BELT USE IN CANADA COULD BE 80% OR EVEN 90% BY 1992".

ON BEHALF OF THE CANADA SAFETY COUNCIL I URGE ALL OF US HERE TODAY TO MAKE THAT COMMITMENT!

THANK YOU.

RANDY C. MCLEAN, P.ENG.
MANAGER
TRANSPORTATION SAFETY

Public Forum on Passenger Car Occupant Restraints
Road Safety and Motor Vehicle
Regulation Directorate
Transport Canada

March 25-26, 1987
Ottawa, Ontario

Brief presented by:
Multi-Disciplinary Accident Research Team
Faculty of Engineering Science
The University of Western Ontario
London, Ontario

For the past twelve years the University of Western Ontario Multi-Disciplinary Accident Research Team has been actively involved in motor vehicle safety research. The research programmes undertaken by the team have taken the form of the in-depth investigation of real-world, motor vehicle collisions, and the investigation of public complaints of potential safety related problems in motor vehicles.

The evaluation of the collision performance of occupant restraint systems has played a large role in both of these activities. As a result of this research the team, in concurrence with many vehicle safety researchers, can attest to the effectiveness of restraint systems in eliminating, or at least reducing the severity of, injuries sustained by motor vehicle occupants over all collision modes. This conclusion has once again been highlighted as one of the results of a preliminary analysis of a representative sample of injury-producing collisions involving passenger cars in the area of London, Ontario (1). Such evidence underscores the necessity of vigorously promoting seat belt use across Canada, and provides strong support for the federal-provincial initiatives in this regard.

A major part of the team's research effort on the collision performance of restraint systems has been involvement in the Multi-Disciplinary Accident Investigation (MDAI) programme and the Fully-Restrained Occupant Studies (FROS) which have been funded by Transport Canada.

These programmes have involved exhaustive studies of specific motor vehicle collisions. The in-depth investigation of these cases provided detailed information on a variety of human, vehicle, and environmental factors associated with the collisions. In particular, the severity of the collision, the manner in which the restraint was used, and the mechanisms of occupant injury were all detailed.

From such research, a good understanding of the effectiveness of occupant restraint systems can be derived. The mechanisms of injury to restrained occupants may be thoroughly documented (2-7), allowing new countermeasures to be proposed. Specific problems with the design of current restraint systems and modes of restraint misuse can be identified (8-9), providing valuable data which can be used to improve the design and performance of future occupant restraints.

In recent times, there has been a move away from Level III collision investigation programmes. In their place, Level II studies such as the Light Truck and Van Study (LTV) and the Passenger Car Study (PCS) have been implemented. The intent of these research programmes is to gather a wide range of data on a statistically-representative sample of criteria collisions.

These studies will provide valuable data bases suitable for general analysis; however, there is a danger that insufficient data will be produced on specific collisions situations such as incidents in which restraint systems play a specific role. Level II studies will allow researchers to identify the significance of specific incidents in terms of the general accident population; however, the fact that collisions are sampled may exclude specific incidents which are of primary interest from the database, or at least severely limit the frequency with which these incidents are investigated.

Examples of specific items of interest might be the question of the effectiveness of three-point restraint systems in the outboard rear seats, or of automatic seat-belt systems, or of driver's side supplementary air bag systems. In the very near future these systems will become more common in the passenger car fleet as manufacturers commence their widespread installation as either standard or optional equipment.

In the first instance, the number of these types of devices which are installed in the vehicle fleet will be small and, consequently, so will their occurrence in randomly-sampled collisions. Thus an evaluation of the effectiveness of such systems will be a long-term activity if only Level II study data are available for this process, as will be the identification of specific problems associated with the use of these systems in real-world situations.

Many problems still exist with the fitment, comfort, convenience, and collision performance of occupant restraints. In particular, a recent paper published by the team (10) highlighted the disastrous consequences which can occur from the advertent or inadvertent misuse of current seat belt systems.

Thus, it is evident that there is a need for a concurrent effort using both Level II and Level III data collection activities if we are to be able to address the parallel concerns of representative and specific data requirements.

The team commends Transport Canada for both its past and present activities with respect to the regulation of motor vehicle occupant restraint systems, the promotion of seat belt and child restraint use laws across Canada, collision investigation and research programmes aimed at developing improved designs and testing methods for these devices.

For the future, the team recommends the following:

1. That the promotion of seat belt and child restraint use be vigorously pursued with an emphasis on public education as to the correct manner in which these restraint systems should be utilized.
2. That the programme of research into improving injury criteria and measurement techniques to be utilized in compliance testing of restraint systems be continued.
3. That a Level III collision investigation programme be funded specifically to evaluate the performance of various types of restraint systems in real-world collisions as a complement to the foregoing.

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March 26, 1987

PUBLIC FORUM ON CAR OCCUPANT RESTRAINTS

- OTTAWA -

My name is Norm Thurston. Although I work for Hyundai Auto Canada Inc. I am here as a representative of the Automobile Importers of Canada. The AIC represents 17 vehicle manufacturers from Europe, Japan, Korea, U.S.S.R., and South America.

The remarks that follow are brief and general in nature as the member companies of the AIC produce vehicles with a wide variety of both active and passive restraint systems. In general, the AIC members unanimously support cost effective, safety related legislation.

For many valid reasons (design, distribution, production costs, advertising, parts supply, even training and publications) it is desirable that; whenever possible, Canadian and US vehicle legislation be in harmony.

It is conceivable, however, that certain conditions may dictate variances in the CMVSS and FMVSS regulations.

Daytime running lights and car occupant restraint legislation are two topical examples.

Recently, Automotive News reported Ford sales figures for vehicles equipped with air bags, that would indicate widespread dealer resistance and consumer disinterest regarding automatic restraints. There is no reason to believe that dealer and consumer attitudes would differ substantially in Canada. For this reason, the AIC members, especially those representing the "economy" segment of the import market, are reluctant to endorse mandatory automatic restraints.

The members of the AIC support Transport Canada's enlightened position that Canadian legislation should allow the manufacturer the option to equip vehicles with traditional three point active front outboard seat belts or an effective automatic restraint system. We feel it is important that legislation should not be "design restrictive" and should allow manufacturers the flexibility of designing/installing automatic restraint systems on a voluntary basis. This approach has been successfully adopted in many industrialized countries. None of the AIC members object to the voluntary use of air bags in conjunction with three point seat belts.

It is important that any decision to mandate automatic restraints in Canada be deferred until sufficient data is available to accurately assess the cost, reliability, and effectiveness of the alternate systems. The decision should also be deferred until the existing injury criteria can be reviewed as some of the AIC members consider the present criteria inadequate.

It should be noted that some of the import car companies in the USA have already voiced their concerns to the National Highway Traffic & Safety Administration regarding the 50mm chest deflection specification for manual belts when utilizing the Hybrid III test dummy. For this reason, the AIC members urge caution rather than a hasty adoption of the Hybrid III test dummy.

We feel that Transport Canada should continue to promote, in collaboration with all of the Provinces (including P.E.I. and Alberta) the increased use of the existing restraint systems. Transport Canada should also maintain and improve the protection and convenience of the existing restraint systems through ongoing reviews of sections 209/210 of the Canadian Motor Vehicle Safety Standards.

Great Britain and Germany have achieved seat belt user rates in excess of 90% and already Texas, Hawaii and Connecticut are claiming wear rates in the 60 to 70% range as a result of active "post law" programs. These figures would indicate that Government sponsored programs have tremendous potential for increasing belt usage.

REGARDING REAR SEAT RESTRAINTS...

At the present time, the trend in the import car industry is towards the voluntary installation of three point rear outboard seat belts. Most of the member companies of the AIC presently install outboard rear three point seat belts in some (or all) of their models, and many are presently developing retrofit kits for dealer installation.

Any discussion on car occupant restraints should include child safety seats and infant carriers. All AIC members promote the use of child safety seats/infant carriers and are supportive of the initiatives taken by Transport Canada.

The members of the AIC would like to take this opportunity to express our gratitude for being allowed to participate in this forum and to state our views on car occupant restraints.

At this point Mr. Gebhard Hespeler, the Safety Engineering Manager of Mercedes-Benz of North America will present a brief after which

Mr. Anthony Preuss,Manager Vehicle Regulations, Volkswagen-Audi
Mr. Bill Scully,Manager of Safety Engineer, BMWNorth America
Mr. Gebhard Hespeler

or myself would be pleased to respond to any questions that you may have.

Consumers' Association of Canada

Association des consommateurs du Canada

National Office • Siège social

Box 9300
Ottawa, Ontario K1G 3T9
Telephone (613) 733-9450

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THE PROVISION FOR APPROPRIATE CHILD RESTRAINT DEVICES AT MAJOR AIRPORT AUTOMOBILE RENTAL AGENCIES: A REVIEW OF TWO INQUIRIES

Joyce L. Solomon, Co-Chair

National Child Safety Committee
Consumers' Association of Canada

For presentation at the Transport Canada
Public Forum on Passenger Car Occupant Restraint

March 25-26, 1987
Ottawa, Ontario

I. Overview

The report to follow is the culmination of events initiated by two similar inquiries received by me at the La Leche League Conference, July 3-6, 1986 in Ottawa, Ontario. The inquirers were concerned about the safe transportation of their young children in vehicles rented through airport rental car agencies. Though attempts were made in both cases to secure guaranteed suitable restraint systems from the agencies, such a guarantee was not given, and both decided in the end to travel with their own carseats.

Contact with Transport Canada, the rental agencies, the respective airport managers, and the travel agency involved is outlined and/or documented. A summary and conclusions follow.

II. Inquiries received

During the La Leche League Conference, July 3-6, 1986 at the Westin Hotel in Ottawa, Ontario, I was approached by Kathryn Holman of Nepean, Ontario, and Cynthia Pohran of Ottawa, Ontario regarding attempts to secure appropriate child restraint devices while travelling in rented cars.

Ms. Holman had made travel arrangements through Your Way Holidays of Halifax, Nova Scotia which included a request for a Budget Rent-A-Car and an appropriate carseat for her child at the Halifax International Airport car rental agency. Her trip took place in September, 1985. According to Ms. Holman, neither agency would expressly guarantee that her child would receive an appropriate carseat for use in the vehicle.

Since she was unable to obtain such a guarantee, she decided to take her child's own carseat instead. As a result of this decision, she made no formal reservation for a carseat.

Ms. Pohran travelled to Calgary International Airport in July, 1986, and had made an advance car rental reservation with Hertz Rent-A-Car. She also attempted to secure a guaranteed carseat for her child, but was unable to obtain such a guarantee. She also decided to travel with her child's own carseat. Upon her arrival at the airport car rental agency, she was told that Hertz showed a carseat request, but could not comply due to the recent theft of their available infant carseats.

III. Contact with Transport Canada

Numerous phone conversations took place between myself and Patricia McAinsh and Grant Smith of Transport Canada regarding the issue of the safe travel of the children concerned.

I was forwarded information regarding the law with respect to this issue, and the names and addresses of Canadian airport managers. I was advised to contact the agencies involved and forward copies of the correspondence to the appropriate airport manager, and as well, to inform Transport Canada of my progress.

IV. Contact with Airport Managers/Travel Agency/Car Rental Agencies

On August 6, 1986 I wrote to Your Way Holidays of Halifax, Nova Scotia regarding Kathryn Holman's attempt to have a guaranteed carseat. Copies of the letter were sent to Budget Rent-A-Car; G. Knox, Airport Manager, Halifax International Airport; and to Patricia McAinsh, Transport Canada. As well, a letter on behalf of Cynthia Pohran was directed to L.V. LeGros, Airport Manager, Calgary International Airport, with copies to Hertz Rent-A-Car and Patricia McAinsh of Transport Canada.

Both letters requested corrective action on behalf of all parties involved as 'airport car rental agencies must by law provide a properly installed carseat appropriate to the child travelling in the rented car for those children accompanying adults renting cars at such agencies.' (See attached letters.)

V. Replies

a) Regarding Kathryn Holman

In a letter dated August 13, 1986, David L. Gooderham, Director, Operations Administration for Budget Rent-A-Car of Canada (Toronto) stated: "While we try constantly to maintain the highest possible level of service to our customers around the world, we cannot be all things to all people. . . only a few callers require an infant seat. . . these items can only be booked on a "request only" basis." "If (a traveller) chooses to extend his trip. . . we cannot insist that (he) return his vehicle on a specific date. For this reason, there is the rare occasion when a customer is disappointed that his request cannot be filled." Further, he states "through letters such as these. . . we are able to correct some of our shortcomings and continue to improve our level of service."

Ellen Noddin, Reservations Co-ordinator for Your Way Holidays replied in a letter dated September 4, 1986 that she received a copy of the letter from Budget Rent-A-Car and that it explained "Budget's position as far as availability of carseats is concerned." She also stated that Your Way Holidays is "always eager to service our clients and . . . through letters such as yours. . . we are able to improve our service further." (See attached letters.)

b) Regarding Cynthia Pohran

Larry LeGros, Airport Manager, Calgary International Airport replied in a letter dated August 27, 1986 "we are concerned that Hertz Rent-A-Car was unable to meet this (licence for service) requirement and have requested that action be taken to ensure that further demands are met." A copy of a September 15, 1986 letter from Mr. LeGros to Mr. G. Diraddo, Manager, Hertz Rent-A-Car, Calgary International Airport was also forwarded to me. It stated "the incident described (regarding Ms. Pohran) . . . indicates that Hertz Rent-A-Car failed to meet their obligations (according to the licence agreement)." "By not ensuring child restraint devices are available you are forcing potential clients to choose between looking for alternate service or breaking the child restraint law. . ."

A copy of Mr. Diraddo's September 24, 1986 reply to Mr. LeGros states that Hertz Calgary "implemented a demand rental program with a local firm that rents these child seats on a daily, weekly basis." "In future should our inventory not allow us to meet the demand we will draw upon this resource." (See attached letters.)

VI. Comparison between the car rental agencies' responses

The obvious difference between how the two incidents were handled lies in the rental agencies' commitment to the proper service of their clients. Each agency wished to 'improve their level of service,' yet only Hertz (and not Budget) took action to ensure their level of service would be improved (linking up on a demand basis with a firm renting child carseats). Budget's response in this situation is deplorable.

VII. Conclusions

The outcome of the rental situations for both inquirers is unsatisfactory at best. That they each felt it was safer to use their own carseats than rely simply on a "request" for a carseat merits further consideration. When a traveller uses the child's own carseat, it essentially relieves the car rental agency of a responsibility for a service which, by law, the agency is required to provide.

There seems to be a large discrepancy in the interpretation of the legal requirement to provide a suitable and properly installed child restraint device. As long as this requirement exists, what is the difficulty on the part of the rental car agency or related travel industry agency with "guaranteeing" a suitable carseat rather than supplying one on a "request-only" basis at the airport rental agencies (all of which fall under Transport Canada's jurisdiction)? Who is ultimately liable?

VIII. Suggestions

As a result of the conclusions drawn from the foregoing report, I offer the following suggestions:

a) An information campaign to alert the travel industry agencies as to their exact legal requirements in the safe transport of children requiring carseats in which:
   1. Transport Canada informs the agencies of the legal requirements
   2. The agencies develop and use brochures outlining the availability of carseats for those children requiring them

3. The agencies would further be compelled to ask their customers as to whether or not they are travelling with children who would need child restraint devices (and subsequently supply, properly install, and provide instructions for the proper use of these devices
4. The car rental agencies would as well be required to provide suitable information to the customer regarding the proper installation of the carseat in the car and the child in the carseat
5. The car rental agencies would be required to guarantee by phone or document the availability of carseats at their respective major airport rental agencies

b) As well, similar to the Hertz Rent-A-Car Calgary agency's plan to implement "a demand rental program with a local firm," a further investigation into joint/link-up local rental programs is necessary. The need for this has been demonstrated.

- - -

The safe transportation of children in this country must be guaranteed. Though the law pertinent to the circumstances described in this report requires that appropriate child restraint devices be provided for those needing them, it appears that at least one car rental agency will rely on semantics alone in order to relieve itself of its legal requirement. What child can afford to rely on semantics to protect him?

APPENDIX

A Personal Note

A situation of a similar nature occurred which involved personal friends. They travelled in August, 1984 from the United States to Montreal, Quebec by plane. In attempting to rent a car from one of the rental agencies, a carseat was requested for their three month old infant. They were in fact provided a carseat--a toddler, forward-facing only type of carseat which required a tether bolt. There was no tether bolt provided or installed, and no instructions as to how to properly install the carseat in the car, much less the child in the carseat. Essentially, my friends were provided a totally inappropriate child restraint device for a child of their infant's age by a rental agency/agent who should have been better informed as to the proper device and its installation and use.

Though changes to the Vehicle Rental Service Licence did not occur until later that year, this situation could still occur today, given an uninformed agent, the lack of proper instructions, and the lack of proper training on the part of the rental company.

SUMMARY OF CHANGES TO THE AIRPORT VEHICLE RENTAL CONCESSION POLICY

OCTOBER 1984

Attached is a final copy of the revised Airport Vehicle Rental Policy which will be used to conduct the upcoming tender in the fall of 1984 and to administer new vehicle rental licences to become effective January 1, 1985.

The new policy has been prepared following extensive review and industry consultation. This commenced in February 1983 when input was sought from all current concession operators across Canada, as well as other representatives of the vehicle rental industry. Based on the information collected in this early phase of the program, a draft policy was released in February 1984 and representatives of the vehicle rental industry were invited to provide any further comments. A meeting was held in March 1984 for industry to present their positions to Departmental representatives in person.

The attached policy retains many of the basic features and serves the same objectives as the 1979 policy. Changes have been made to resolve some minor administrative details and to eliminate some of the restrictions in the present policy.

RÉSUMÉ DES MODIFICATIONS APPORTÉES À LA POLITIQUE DE LOCATION DE VÉHICULES

OCTOBRE 1984

Vous trouverez ci-joint une copie finale de la politique de location de véhicules telle que révisée, qui sera utilisée lors de l'appel d'offres à l'automne 1984 ainsi que pour administrer les nouveaux permis de location de véhicules devant entrer en vigueur le 1er janvier 1985.

La nouvelle politique a été préparée suite à une révision en profondeur et à des consultations avec les représentants de cette industrie. Le tout a débuté en février 1983 lorsque des commentaires et idées furent demandés à tous les détenteurs de concessions à travers le Canada ainsi qu'à d'autres représentants de l'industrie de la location de véhicules. Basé sur l'information accumulée lors de cette phase préliminaire du programme, une ébauche de politique fut publiée au mois de février 1984 et les représentants de l'industrie de la location de véhicules furent invités à soumettre des commentaires additionnels. Une réunion eut lieu au mois de mars 1984 afin de permettre aux représentants de cette industrie de faire part de leur position en la matière aux représentants du Ministère.

La politique ci-jointe retient plusieurs caractéristiques de base et répond aux mêmes objectifs que la politique de 1979. Des modifications ont été apportées afin de résoudre quelques détails administratifs d'ordre mineur et pour éliminer certaines restrictions de la présente politique.

PERSONNEL

10. (1) The Licensee shall engage suitable personnel to efficiently provide and maintain the required standard of services; such personnel shall be properly groomed and attired; local personnel shall be employed to the extent practical and consistent with reasonable efficiency and economy; all as determined by and to the satisfaction of the Airport Manager.

(2)

(3) If the Licensor determines that national security is involved, he may instruct the Licensee to provide information concerning any person or persons employed by the Licensee at the said airport and may require the removal of any person or persons from the said airport. The Licensee shall comply immediately with instructions from the Licensor pursuant to this clause.

(4) The Licensee shall pay for the parking at the said airport of the vehicles of the Licensee's employees, at rates in effect from time to time.

SERVICE PROVIDED BY THE LICENSEE

11. (1) All vehicles used by the Licensee to provide the vehicle rental service at the said airport shall not at any point in time be more than three (3) model years old.

(2) At all times during the currency of this Licence, the Licensee shall have installed in the vehicles used for the provision of service at the airport, child restraint systems in a number sufficient to meet the demands of the travelling public, all as determined by and to the satisfaction of the Airport Manager. All such child restraint systems shall be installed in accordance with the manufacturer's instructions and all such systems must meet the Canadian Motor Vehicle Safety Standards (CMVSS 213.1).

(3) At all times during the currency of this Licence, the Licensee must have readily available access to obtain hand control facilities for the handicapped, in a number sufficient to meet the demands of the travelling public, all as determined by and to the satisfaction of the Airport Manager.

(4) The Licensee shall maintain rates for service and provide a range of types of vehicles at the said airport comparable to the rates for service and range of types of vehicles offered by the Licensee at other locations within the area served by the said airport, all as determined to the satisfaction of the Airport Manager.

Consumers' Association of Canada
Association des consommateurs du Canada

Box 9300
Ottawa, Ontario K1G 3T9
Telephone (613) 733-9450

Publishers of Canadian Consumer and Le consommateur canadien

August 6, 1986

L. V. Legros
Airport Manager
Transport Canada
2000 Airport Road N.E.
Calgary International Airport
Calgary, Alberta
T2E 6W5

Mr. Legros:

It has come to my attention that Cynthia Pohran of Ottawa, Ontario was unable to obtain an appropriate carseat to accompany her rental car when she travelled to Calgary in late July, 1986. She had reserved a car in advance from the Hertz Rent-A-Car Agency only to be told upon arrival that since certain infant carseats had been stolen, they had no carseat in which her accompanying young child could safely travel.

It is my understanding that airport car rental agencies must by law provide a properly installed carseat appropriate to the child travelling in the rented car for those children accompanying adults renting cars at such agencies.

I would appreciate hearing from you at your earliest convenience as to the corrective action required in this matter.

Sincerely,

Joyce Solomon

Joyce Solomon
Co-Chair
National Child Safety Committee

Enclosure
cc: Hertz Rent-A-Car; Pat McAinsh, Transport Canada

Transport Canada Transports Canada

Airport General Manager
Calgary International Airport
2000 Airport Road N.E.
Calgary, Alberta T2E 6W5

Your file Votre reference

Our File Notre reference

5156-102-E23

August 27, 1986

Ms. Joyce Solomon
Co-Chair
National Child Safety Committee
Consumers' Association of Canada
Box 9300
Ottawa, Ontario
K1G 3T9

Dear Ms. Solomon:

This is in reply to your letter dated August 6, 1986 regarding Cynthia Pohran's complaint that she was unable to obtain an infant carseat when she rented a vehicle from Hertz Rent-A-Car at Calgary International Airport.

The licence granted to Hertz Rent-A-Car, by Transport Canada, for service at the Airport does require the provision of child restraint systems in a number sufficient to meet the demands of the travelling public. We are concerned that Hertz Rent-A-Car was unable to meet this requirement and have requested that action be taken to ensure that future demands are met. You will find attached a copy of our letter to Hertz Rent-A-Car. Upon receipt of their response you will be advised of the action taken to ensure child restraint devices will be available.

Thank you for bringing this matter to our attention.

Yours truly,

for Larry V. LeGros
Airport General Manager

cc: Mr. G. Diraddo,
Hertz Rent-A-Car, Calgary

Airport General Manager
Calgary International Airport
2000 Airport Road N.E.
Calgary, Alberta T2E 6W5

September 15, 1986 **5156-102-E23**

Mr. G. Diraddo
Manager
Hertz Rent-A-Car
Calgary International Airport
2000 Airport Road N.E.
Calgary, Alberta
T2E 6W5

Dear Gino:

This is further to your telephone discussion with Jack Reid regarding a letter of complaint we received from the Consumers' Association of Canada. I am attaching a copy of the complaint for your review.

As you know clause 11.(2) of the Licence Agreement between Hertz Rent-A-Car and Transport Canada requires that child restraint devices be provided in sufficient number to meet the demands of the travelling public. The incident described in the attached letter indicates that Hertz Rent-A-Car failed to meet their obligation in this regard.

The intent of Clause 11.(2) of our agreement is to provide a safe and satisfactory level of service to the travelling public. By not ensuring child restraint devices are available you are forcing potential clients to choose between looking for alternate service or breaking the child restraint law enacted in Alberta on December 31, 1984. These choices do not reflect a safe or satisfactory level of service and therefore are not acceptable.

I will expect a response from Hertz Rent-A-Car by September 26, 1986 indicating the action taken to ensure that the demand for child restraint devices will be met in the future.

Yours truly,

Original signed By
J. ALLISTON

Larry V. LeGros
Airport General Manager

attachment

DRAFTED BY

APPROVED BY

COORDINATED WITH

Hertz

HERTZ CANADA LIMITED
2323 78th Avenue N.E., Calgary, Alberta T2E 7O1 (403) 250-0361

SEP 29 1986

September 24th 1986

Mr. L.LeGros
Airport General Manager,
Calgary International Airport,
2000 Airport Road, N.E.
Calgary, Alberta T2E 6W5.

Dear Larry,

Thank you for bringing this incident to my attention. Hertz understands the Licence Agreement and agrees that we have a responsibility to provide child restraint devices where necessary. We have implemented a demand rental program with a local firm that rents these child seats on a daily, weekly basis.

In future should our inventory not allow us to meet the demand we will draw upon this resource.

Hertz has always recognized the need to maintain customer saftey and will continue to do so.

I trust this meets with your approval.

Sincerely,

Geno Diraddo
City Manager
Calgary.

cc
Joyce Solomon.
Jack Reid.

Consumers' Association of Canada

Association des consommateurs du Canada

National Office • Siège social
Box 9300
Ottawa, Ontario K1G 3T9
Telephone (613) 733-9450

Publishers of Canadian Consumer and Le consommateur canadien

August 6, 1986

President
Your Way Holidays
2070 Oxford St.
Halifax, Nova Scotia
B3L 2T2

Mr. President:

It has come to my attention that Kathryn Holman of Nepean, Ontario was unable to be guaranteed an appropriate carseat to accompany her rental car when she travelled to Halifax in late September, 1985. She had requested, through your office, a Budget Rent-A-Car for pick-up at Halifax International Airport and as well, a carseat for her young child.

It is my understanding that airport car rental agencies must by law provide a properly installed carseat appropriate to the child travelling in the rented car for those children accompanying adults renting cars at such agencies.

I would appreciate hearing from you at your earliest convenience as to the corrective action required in this matter.

Sincerely,

Joyce Solomon

Joyce Solomon
Co-Chair
National Child Safety Committee

cc: Budget Rent-A-Car; G. Knox, Airport Manager; Pat McAinsh,
Transport Canada

Enclosure

Budget Rent a Car of Canada Limited
P.O. Box 2003
20 Eglinton Avenue West
Toronto, Ontario M4R 1K8
Telephone: (416) 486-2919

AUG 1 8 REC'D

Budget®

August 13, 1986

Ms. Joyce Solomon
Consumers' Association of Canada
P.O. Box 9300
Ottawa, Ontario
K1G 3T9

Dear Ms. Solomon:

Your letter of August 6, 1986 to Your Ways Holidays in Halifax has been referred to me for response.

I sincerely apologize for any inconvenience caused Mrs. Holman while she tried, apparently in vain, to be guaranteed an appropriate car seat for her young child. Your letter was unclear as to whether or not Mrs. Holman did actually obtain the requested childseat upon arrival in Halifax.

While we try constantly to maintain the highest possible level of service to our customers around the world, we cannot be all things to all people. Just as only a limited percentage of travellers specifically request a "station wagon" or a "red car"; only a few callers require an infant seat. Unfortunately, these items can only be booked on a "request-only" basis rather than a guaranteed reservation.

Your understanding that airport rental agencies must provide these seats by law is correct, in essence. Specifically, Paragraph 11 (2) of the terms and conditions of Vehicle Rental Service License of January 1, 1985, states that a sufficient number of these seats be available "to meet the demands of the travelling public, as determined by and to the satisfaction of the Airport Manager".

While we make every effort to accommodate all customers requests, we cannot insist that a traveller return his vehicle on a specific date, if he chooses to extend his trip for whatever reason. For this reason, there is the rare occasion when a customer is disappointed that his request cannot be filled.

.../2

I hope that the foregoing is a satisfactory response to your concern. It is through letters such as these that we are able to correct some of our shortcomings and continue to improve our level of service.

Yours sincerely,

David L. Gooderham
Director, Operations Administration

DLG/jd

cc: Budget Rent a Car-Halifax
Your Ways Holidays
Colleen Chapeskie
Ross Freeman

Your Way Holidays
Division of REGIONAL APPROACH LTD
Telex 019-23821
2070 Oxford Street, Halifax, Nova Scotia Canada B3L 2T2 (902) 422-1405

SE [illegible]

September 4, 1986

Consumers Association of Canada
Box 9300
Ottawa, Ontario
K1G 3T9

Attention: Joyce Soloman
Co-Chair/Nat'l Child Safety Committee

Dear Ms. Soloman:

Thank you for your letter of August 6, 1986 regarding the availability of car seats from rental car companies.

I have received a copy of the letter sent to you by Budget Rent-A-Car. This explains Budgets position as far as availability of car seats is concerned.

Also, I have checked our files on Ms. Holman's request for a car seat. I have found that the only special request made through this office was for a 4-door vehicle. I do not have record of a car seat being requested.

Again, thank you for your letter of concern. We are always eager to service our clients and it is through letters such as yours that we are able to improve our service further.

Regards,

Ellen [illegible]

Ellen N[illegible]ldin
Reservations Co-Ordinator

/ecn

Consumers' Association of Canada

Association des consommateurs du Canada

National Office • Siège social
Box 9300
Ottawa, Ontario K1G 3T9
Telephone (613) 733-9450

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RESTRAINT DEVICE INQUIRIES RELATING TO CHILDREN:
A REVIEW

Joyce L. Solomon, Co-Chair

National Child Safety Committee
Consumers' Association of Canada

For presentation at the Transport Canada
Public Forum on Passenger Car Occupant Restraint

March 25-26, 1987
Ottawa, Ontario

INTRODUCTION

The material contained in the following report is the result of investigation on behalf of inquiries received by the National Child Safety Committee. In addition to the information received from Transport Canada personnel, a brief appendix in which literature pertinent to the report is contained follows.

ACKNOWLEDGEMENTS

The National Child Safety Committee wishes to thank the following people at Transport Canada for their support: France Legault, Patricia Mc Ainsh, Grant Smith, Terry Burtch, Murray Dance, D.J. Dalmotas, Patty Kuntz.

I. Overview

In the course of my term as Co-Chair of the National Child Safety Committee of the Consumers' Association of Canada, I (and my Co-Chair* as well) have received numerous inquiries relating to carseats, as well as other restraint systems (booster cushions, 2-and 3-point seat belts).

Many of the inquiries simply deal with the question "which is the best carseat?" --a naive question at best. There appears to be quite a discrepancy between general information provided about carseats available and the information the inquirer actually needs to know: the "how to's" and "why's" of carseat or other restraint use.

The following is a brief summary of some of the major issues which need to be addressed in the course of providing this vital information to consumers.

II. Information Seeking

Consistent information regarding carseat/booster cushion use is not readily available--unless you know who, how, and where to ask.

The following is a list of questions a consumer needs to ask:

A) How do I choose a carseat/which is the appropriate carseat for my needs--and my car?

This question not only examines who will be the user of the restraint device but also where the carseat will be used. Not all children fit all carseats and not all carseats fit all cars. What happens when the carseat must be transferred on a continual basis from one car to another? Obviously both cars must be considered when purchasing and using a carseat.

---

*Charlene Elgee

The "try before you buy" rule always applies here. Also, it is extremely important that the carseat meet Canadian standards. There may indeed be standards for devices sold in other countries but one cannot assume compliance with Canadian standards, which in many cases may be more stringent.

B) What about second-hand carseats--are they a good choice?

Here, the answer depends on several factors: whether or not the carseat has been in an accident or dropped--as the structural integrity of the carseat might be affected, whether or not the carseat has any parts missing or loose--this interferes with safe adjustment of the carseat, whether or not the carseat has been recalled, whether or not the full set of instructions is available, whether or not the carseat complies with the current Transport Canada standards.

C) How do I properly install the carseat in my car/my child in the carseat?

Herein lies the crux of safe travel. In order for any restraint device to fully protect a child as it was designed to do, the device must be properly installed according to manufacturer's instructions and the child must be properly secured in the device. Instructions may be provided with the packaging, but they may not be as specific as is necessary for proper use.

When the onus is on the consumer (who may indeed be an uninformed first-time user) to ensure proper adjustment in the case of no specific instructions, it may lead to a potentially very hazardous situation of improper, unsafe use of the device. As well, a note regarding the seasonal adjustment of straps to accommodate seasonal clothing changes is a must. Proper installation and use of a tether anchorage system must be specifically outlined. Again, the onus is on the (possibly uninformed) consumer to assure proper installation and, in fact, there have been cases of improper dealer/garage mechanic installation of tether anchorages.

D) What is the appropriate duration of use for each restraint device? How is this determined? How long should my child be rear-facing?

Our inquirers are often under the misguided impression that duration of use of a particular carseat is governed by the arbitrary weight restrictions mentioned in the instructions, usually a breakdown of 9kg/20 lb. for an infant seat and 18kg/40 lb. for a toddler seat. These weight restrictions are based on the "average" 3.18kg/7 lb. baby at birth being 9kg/20 lb. at one year and 28kg/40 lb. at the outer limit of carseat use.

Two specific circumstances merit attention here.

1. A child in a carseat should face the rear of the vehicle, no matter which type of infant or convertible carseat is being used, until one year of age (and not just 9kg/20 lb.). This is because the musculature of a child under one year of age is not developed enough to withstand a forward-facing impact. There is a wide range of ages at which a child may reach 9kg/20 lb. in weight. The parents of those children who arrive at this weight between 4 months and one year of age are certainly ill-advised to place their children forward-facing in an appropriate device, yet the instructions tell them to do so (by virtue of the weight restrictions).

2. A child can continue to use a forward-facing carseat even after exceeding the 18kg/40 lb. limit under specific circumstances. If, when properly occupying the carseat (and booster cushion as well) the mid-point of the child's ear is not exposed past the top of the carseat/seat back of the car, then it is still safe to use the carseat/booster cushion until the mid-point of the ear exceeds this height. It is at that point at which whiplash can occur. The head mass is still quite significant during the age at which these devices are used and it needs to be sheltered and protected.

In the transition from carseat to proper booster cushion use (if it is desired and can be accomplished) or to 2- or 3-point auto restraint use, the head must be safeguarded to attempt to prevent this type of whiplash. If the booster cushion cannot be properly used, then the child should (properly) use the automobile's restraint device.

All of the foregoing information should accompany the appropriate device, not only in the packaging instructions but also affixed to the device. In this way, it will reach all intended users of the product at all times.

III. Distribution of information

There is a wide variation in the accessibility of information relating to the various types of child restraint devices. Outside of the federal, provincial, and territorial governments, there are numerous opportunities through which an individual should be able to obtain pertinent information:

A. Family Physicians
B. Obstetricians
C. Pediatricians
D. Public Health Nurses

All of these provide pre- or post-natal care and should be advised and aware of proper use.

As well, there are other possible areas of distribution:

E. Local offices of law enforcement (at all government levels)
F. Manufacturers of the devices
G. Car dealerships

The above are required to enforce or comply with the laws regarding restraint devices.

The use of public service announcements/commercials on television and radio is yet another medium for public distribution of this information.

There is also a problem in the type of "safety" information available through retail outlets selling child restraint devices. Often, salespeople ill-equipped to answer questions regarding the safety, safe use, compliance, etc. of a particular device are the ones who are approached for this information. They may reassure a potential customer as to "safety" and yet on the whole may be more concerned about the sale of the item than its "safety" or safe use.

IV. "Comfort"-type seat belts

A new problem has arisen in the area of restraint device use. Cars manufactured by Nissan, Toyota, and Suzuki now supply a seat belt which adjusts on a constant basis to provide "comfort" to its occupant.

In fact, this comfort adjustment does not allow for proper installation of carseats or booster cushions as the movement of the belt may allow for the maladjustment of the device--and the potential for greater injury. As well, a young child, still occupying the belt, has been reported to have wriggled to the edge of the seat of the car. It is obvious at this point that the child no longer occupies the belt correctly and is at greater risk. Even if the child placidly occupied the belt, any "comfort adjustment" of the belt may leave the belt improperly adjusted on the child, again with greater risk to injury. Measures, such as the use of a locking clip to make the belt a fixed-length belt may prove impracticable or downright difficult for the average consumer. An option of a different type of seatbelt installation (at the manufacturer's expense) should be pursued.

V. The use of automobile restraint systems on children

In view of the recent Fifth Estate program (CBC-TV) on rear lap belt effectiveness, there are two issues which need to be raised:

1. The proper adjustment of seat belts in general
2. The use of seat belts on children

Unfortunately again, information regarding exactly what constitutes proper seat belt adjustment is sorely lacking. Yet it is precisely this information that is needed in order to reduce injury and better distribute an impact force.

In the case of seat belt use on children, the Fifth Estate program mentioned that children are often rear lap belt occupants. When the program explored the use of a 3-point restraint system in the rear seat of vehicles it did not mention that there may exist children who are between carseat use and 3-point belt use. In fact, this area of the use of a 3-point restraint system on these children has not been studied. Yet the general advice is to place a younger child in this interim height period in the lap portion only of this 3-point belt to avoid cranial/cervical injury in the case where the shoulder portion of the belt would fall across the child's neck.

VI. Enforcement of child restraint laws

The 1985 National Child Restraint Use Survey by Transport Canada states that in the 0-5 age range, 22% proper use of child restraints was observed. This percentage must be improved.

There should be a follow-up (ideally in the post-natal period) to ensure that child restraint devices are being used and used correctly.

When this is not a possibility, we must rely on law enforcement programs and "crackdowns". If, once the information has been provided to users/potential users and a follow-up does not denote proper use, then deterrent measures (warnings, tickets) which also include the provision of useful, proper information need to be employed, and more thoroughly than is currently being done.

VII. Conclusions/Suggestions

From all perspectives there is a lack of consistent information readily available to the user/consumer of child restraint devices and general automobile restraint devices. Certain aspects require further study, others the assurance of enforcement. The following is a list of suggestions to further the proper use of restraint devices for children:

A) An information campaign:

1. The development of more comprehensive brochures which include basic instructions on restraint device use and which also contain the foregoing "how to" and "why" questions and answers. These brochures can be included with carseat packaging as well.
2. A more consistent, comprehensive, mandatory distribution program for device usage information through:
    a. Family physicians/obstetricians/pediatricians
    b. Public health nurses
    c. Local law enforcement offices
    d. Manufacturers
    e. Car Dealerships
    f. Retail outlets

3. A public service announcement system over television and radio providing general information about where to obtain brochures, get help, etc.
4. The development of commercials which can depict the safe use of child restraint devices. These should be displayed during "prime-time" viewing hours.
5. A "help-line" telephone number available for consumer inquiries

B) Organized, regular deterrent "crackdowns" need to be employed which will not only produce a warning or a fine for improper use of child restraint devices, but also will provide information necessary to assure compliance with the law.

C) Further study of the use of "comfort" type seat belts in conjunction with child restraints and children. For the present, the option of other types of seat belts more suitable to younger users should be available (at manufacturer's cost) to the consumer at the time of order/purchase.

D) Further study of the use of 3-point restraint systems on children who have outgrown a carseat/booster cushion but who may be too short to allow for proper adjustment of the shoulder strap. This would determine whether additional risk of injury is created by improper adjustment of the shoulder strap as opposed to omitting its use.

In this era of consumerism, many are seeking information regarding proper restraint device use. It is incumbent upon us to insure that consistent, comprehensive information on safe use of these devices is provided.

APPENDIX

5.0 CONCLUSIONS

From the studies reviewed concerning the restraint of school age children, the following conclusions can be drawn:

1. The risk of injuries and fatalities is reduced with the use of restraints.
2. The majority of the injuries occurred to the head and the extremities.
3. There is some need for more testing to evaluate booster cushions and to determine appropriate restraints for school age children.
4. There are few studies regarding biomechanical tolerances of children.
5. There is a need to develop better test dummies which represent this population.
6. Detailed studies of accident data should include a correlation between restraints, seating positions, injury type and severity, and crash configurations.

"The Restraint of School Age Children in Automobiles: A Literature Review Update," Biokinetics and Associates, 1986.

provides potentially useful data but, at present, it cannot be used for compliance test purposes because of this lack of appropriate criteria.

13) Studies should be undertaken to establish some gross measurements of children's tolerance to skull fracture.

14) Studies should be undertaken to develop ATD instrumentation capable of assessing the probability of child skull fracture and skeletal injury during a crash.

15) Design studies should be undertaken to explore new concepts in child seating systems that are safe, inexpensive and convenient.

16) Reliable, statistically valid, field accident data should be collected on automobile crashes in which a CAR has been used. Possibly the Transport Canada MDAl teams could establish a mechanism and procedure for investigating such accidents, and for the collection, analysis and dissemination of data. Only through such a study can it be determined if the performance requirements of the regulations are appropriate to real automobile crashes.

17) Automobile producers should be constantly reminded that young children frequently occupy the vehicles they design. It is not unreasonable to suggest that significant steps could now be undertaken to provide a safer environment for these passengers.

"Child Automotive Restraint System Testing," Biokinetics and Associates, 1979.

"Are 1974-1975 Automotive Belt Systems Hazardous to Children?," R.G. Snyder and B. O'Neill, American Journal of Diseases of Children, August, 1979, Vol. 12

in tests conducted to determine child straint protection performance was the use of anesthetized baboon (*Papio cynocephalus*) subjects in tests conducted by Ford Motor Company in 1967, prior to release of the Ford Tot Guard. In these tests, conducted at 20 and 35 g, in forward and oblique decelerations, the animal subjects were sacrificed after impact and complete macroscopic and microscopic autopsy procedures were conducted to determine any trauma and protection limits with this restraint system. Baboons have also been used at Wayne State University in their evaluation of air bag restraint protection of children, but such tests have been limited to date.

The various 1974 and 1975 three-point restraint systems were mainly tested with adult dummies ranging from 5th percentile female to 95th percentile male. Limited tests conducted within industry, using "3- and 6-year-old size" dummies, must be considered inconclusive relative to both valid simulation of body kinematics and the inability to infer whether an injury would or would not have occurred. In 1973, a limited survey was conducted by General Motors engineers to determine if their 1974 three-point restraint system would fit 3- and 6-year-old dummies properly. This was accomplished by placing these dummies in the front seats of five different vehicles equipped with proposed 1974 belt systems. It was reported that when bench seats were used, the 3-year-old dummy had belt-to-neck contact, which could be reduced by repositioning the dummy further inboard. However, in bucket seats the upper-torso belt came across the 3-year-old dummy's face and there was not lateral room for repositioning. With the 6-year-old dummy, belt-to-neck contact reportedly also occurred with the bucket seat. In a subsequent survey of 3- to 8-year-old children of General Motors' personnel, it was confirmed that belt irritation was more of a problem with bucket seats, and it was concluded that if irritation continues after repositioning the child, "... the child can be lap belted in the rear seat." Several subsequent dynamic tests were conducted using 3- and 6-year-old dummies; however, [illegible] injury data obtained with these dummies is of questionable value, therefore data other than belt loads was not recorded. Similarly, child impact protection performance of various restraints in actual crashes has been sparsely and sporadically obtained and is not sufficiently conclusive since it is not known how representative it is. Siegel et al studied 46 automobile crashes in California involving 82 children between birth and 12 years of age. Four children were restrained by lap belts. In this study, conducted at the University of California at Los Angeles, examples of child use of seat belts under actual impact conditions were presented where lap belt pressures in excess of 100 pounds per square inch were calculated to have occurred with minimal or no injury sustained.

The largest set of real-world crash data available is the National Highway Traffic Safety Administration *Collision Performance and Injury Report* computerized file. This file contains data from clinical accident investigation teams under the sponsorship of the Motor Vehicle Manufacturers Association, the National Highway Traffic Safety Administration, and the Canadian Department of Transportation. Great caution is necessary when making inferences from these data because, in general, the cases were investigated without a statistical sampling plan; this severely limits the generality of any conclusions that can be drawn from the data.

Bearing this caution in mind, it is still possible to gain some insight into the comparative performance of various restraint systems from these data. A search of the file indicated only 26 crashes in which a child aged 5 years or less was restrained either by a safety belt or a child seat. We examined the detailed descriptions of the investigations of these crashes.

A total of 33 children were involved in these crashes. Eighteen were restrained by lap belts only, one by a lap and upper-torso belt (four-point), and seven by child seats, while six were inadequately restrained in child seats that were simply hooked over the automobile seat (so-called hookover child seats), and one was in an unrestrained infant seat.

The four-point belt was worn by a 3-year-old child in a car that backed up at approximately [illegible] into another car. No one in either car was injured and the restraint was not a factor. Thus, in the *Collision Performance and Injury Report* file there is no crash experience reported on which to make judgments as to the either beneficial or injurious effects of upper-torso restraints for children.

On the other hand, the trend that the remaining data show is that the use of either the lap belt restraint or a restrained child seat is apparently effective in reducing injury. Nine of the 18 children restrained by lap belts received no injuries. Of the remaining nine, seven received minor injuries (Abbreviated Injury Scale 01[illegible]) and two received moderate injuries (Abbreviated Injury Scale 02). These latter two children were right-seat occupants in cars that were struck on the right side.

Five of the seven children in restrained child seats received no injuries and two received minor injuries (Abbreviated Injury Scale 01). Only one of the six children in the hookover seats was uninjured, four received minor injuries (Abbreviated Injury Scale 01), and one received a moderate injury (Abbreviated Injury Scale 02). The one child in a completely unrestrained infant seat received a serious injury (Abbreviated Injury Scale 03).

Conclusion

Although there is not as much evidence as we would like, until better data are available we can make the following conclusions:

1. Younger children (and infants) should use specially designed child or infant restraint systems as a highly recommended first choice

2. Lap belt restraints appear to offer protection even for younger children in the isolated crashes reported. Where child restraints are not available, parents should use lap belts as a second choice.

3. The preponderance of evidence

"Are 1974-1975 Automotive Belt Systems Hazardous to Children?," R.G. Snyder and B. O'Neill, American Journal of Diseases of Children, August, 1979, Vol. 1

overwhelmingly demonstrates that an occupant, whether infant, child, or adult, is less likely to be killed or injured in a crash while restrained. Thus, until contrary evidence is available, 1974 and 1975 three-point belt systems (although designed for adults) should be used by small children where either a child restraint device or lap-belted seat position is not available, as a third choice. Whether it offers greater or less protection against impact collision injury hazards than a lap belt alone would appear to depend on a number of factors related to body size and various restraint and seat positions possible, and is not yet supported by either experimental or field crash evidence. In the interim, parental judgment should be exercised; in some cases it has been suggested that the upper-torso belt could be placed behind the child if the fit obviously is incorrect, but this may not be possible or feasible in some cases, and it might be better to move the child in such cases to a center or rear seat equipped with only a lap belt.

4. Child seats that hook over regular automobile seats should not be used.

5. Under no circumstances should children and infants be unrestrained in a motor vehicle.

In view of the paucity of accident data involving small children using any type of restraint system, we urge that pediatricians report cases involving injuries associated with particular restraints as well as cases in which the restraints have been effective in preventing or reducing the severity of injuries.

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of the epiphyseal plate stops proliferation and begins to ossify. Thus, the bony epiphyseal cap is united to the shaft. In females the epiphyses unite sooner so that growth in length ceases earlier by about 2–3 yr when compared to males of similar ages. But even in the male most of the fusions of long bone epiphyseal cartilages are completed at about the 20th yr. Obviously since bone length is a factor of epiphyseal cartilage growth, traumatic displacement of the cartilage out of line with the normal long axis of the bone can lead to gross limb distortion and malformations.

BIOMECHANICAL PROPERTIES OF TISSUES

Various workers have indicated that the tensile strength of tissues is less in children than in adults. Tissue strengths have been found to be the strongest at about 20 yr of age. Biomechanical testing has been conducted on such tissues and organs as muscle (Katake, 1961), peripheral nerve (Okamoto, 1955) urinary bladder (Asmai, 1961) gut wall including stomach, esophagus, and intestine (Fukuyama, 1961; Nonogaki, 1960; Wasaki, 1953), costal cartilages (Ko, 1953), skin (Ridge and Wright, 1966), blood vessels (Frasher, 1966; Mochizuki, 1952), tendons (Van Brocklin and Ellis, 1965; Blanton, 1964; Takigowa, 1953) and bone (Evans, 1957; Hirsch and Evans, 1965; Herrmann and Liebowitz, 1969, Kraus, 1968). Studies involving the mechanical properties of tissues have recently been reviewed by Fung (1968). Although adult cadaver impact tests have been conducted, no experimental impacts using young cadavers to determine human tolerances have been carried out.

CONCLUSIONS

Infants and children are not miniature adults. Their anatomy differs from the adult in a number of ways which cannot be overlooked in the proper design of occupant restraint systems specific to their age. Safe vehicular packaging for the infant and child requires protective devices based on child anatomy rather than on the anatomy of the adult. Within the framework of automobile safety design we have emphasized that:

(1) The frequency of head injuries in children involved in automobile accidents may be due to the child's proportionately large head and higher center of gravity. As a consequence, infants and children restrained by a lap belt have a greater chance of being projected over the restraining belt because the CG and body fulcrum is located above the belt location.

(2) Observations that the child's head is relatively massive and supported poorly from below have been implicated in head snapping with rapid body deceleration. Such sudden snapping or rotation of the relatively unrestrained child's head can traumatize related nerves, blood vessels, and spinal cord segments.

(3) Contributing to brain injuries of the young child is the relative lack of skull protection since, early in life, the skull is not an intact bony case for the brain but is a series of broadly spaced elastic bones.

(4) Growth rates of different parts of the body vary with age. For example, the midpoint of the body is above the navel at birth, slightly below it at 2 yr, and nearer the pubic bones at 16 yr.

(5) Since growth of the child is dependent upon the normal activity of growth centers, protection of these centers is vital. Abnormalities of body stature and limb mobility might result from injury to growth centers of the extremities. Similarly, in the head, the arrangement of teeth as well as the facial profile can be affected by traumatic injuries to the facial growth centers.

(6) Differences in size, structure, shape, and biomechanical properties of the infant, child, and adult pelvic skeleton are clearcut and must be considered in terms of proper lap belt design, position, and vehicle anchorage. Key differences include the absence of the anterior superior iliac spines and sufficient

"Infants and Children in the Adult World of Automobile Safety Design: Pediatric and Anatomical Considerations for Design of Child Restraints," A.R. Burdi et al., 1969, reprinted in "The Restraint of School Age Children in Automobiles: A Literature Review," Biokinetics and Associates, 1979.

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space in the pelvic-thigh angle for adequate positioning of the adult lap belt on the child.

(7) Unlike the adult, the organs of the chest are housed in an elastic and highly compressible thoracic cage. Organs as the lungs and heart are extremely vulnerable to nonpenetrating impacts to the chest. The smaller rib cage also means less protection is offered to larger abdominal organs which would normally receive some protection from the larger stronger rib cage of the adult. The highly elastic structure of the thoracic cage is not amenable to direct trauma or loading of webbed restraints in children.

(8) The most effective restraint systems for children are those which distribute impact forces over a large portion of the body.

The general principles for child and infant vehicular restraint systems have been presented in this paper to emphasize the basic anatomical differences between the adult and child that must be considered in providing effective and flexible child vehicular restraints.

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representation of restrained occupants in accidents is directly proportional to that observed in the general driving population, a direct estimate of restraint effectiveness (E) can be made on the basis of the extent to which the representation of restrained occupants (Pr) among those fatally injured differs from that observed in the general driving population (U). This functional relationship, derived in Appendix A, can be expressed as follows:

$$E = 1 - \frac{Pr\ (1 - U)}{U\ (1 - Pr)}$$

The resulting estimates of restraint system effectiveness are given in Table 14. In this case, the age groups correspond to those employed in the restraint use surveys. As can be noted, the estimates of fatality reduction for the three separate age groups considered fell over a very narrow range of 62% - 66%. By way of comparison, the effectiveness estimate in terms of fatality reduction yielded for children in the 0-5 age group (62%) falls midway between that reported by Scherz (93%) and that found in the Center for the Environment and Man study with respect to the reduced incidence of fatal and serious injury among younger children (42.9%), as noted earlier. The present effectiveness estimates also show good agreement with those earlier derived on the basis of Alberta data, particularly as they apply to children.

TABLE 14 - ESTIMATES OF RESTRAINT SYSTEM EFFECTIVENESS IN TERMS OF FATALITY REDUCTION DERIVED ON THE BASIS OF THE PROPORTION OF FATALITIES REPORTED AS RESTRAINED

ONTARIO : 1978 - 1980

Age Interval	% of Fatalities Reported as Restrained *	Assumed Restraint Use Rate**	Implied Fatality Reduction
0 - 5	21.6%	42%	62%
6 -15	20.5%	42%	64%
16+	25.6%	50%	66%
All	25.0%	48%	64%

* Where specified.

** Average wearing rate as derived on the basis of the May, 1978 and May, 1981 Ontario roadside surveys.

DISCUSSION

The 1974 CCA standard introduced dynamic testing of child restraint systems to North America. It also introduced the concept of employing head excursion limits intended to preclude head impact with the vehicle interior as a means of regulating the performance of child restraint systems. While often the subject of controversy, there is little doubt that the introduction of this standard brought about significant improvements in the design and performance of child car seats sold in Canada.

Child restraint systems hold a unique position among occupant restraint systems in that, as after-market products, they must be installed by the consumer. The manner in which the assembly is installed can have a significant bearing on the level of protection that is afforded to its occupant. In the extreme case, such as when the assembly is not even secured to the vehicle by a seat belt, all protection may be lost. The magnitude and nature of the restraint misuse problem in Canada are largely unknown. Several restraint use survey methodologies which would allow such information to be compiled on a regular basis are under consideration by Transport Canada so that progress in reducing the incidence of restraint misuse can be properly monitored.

The proposed amendments to CMVSS 210 are intended to resolve one of the more significant problems encountered by consumers in properly installing child car seats, that of installation of the tether anchorage hardware. To alleviate problems in the near term, the head excursion criterion proposed in CMVSS 213 should extent the range of child car seats sold in Canada to include a limited number of tetherless designs.

Child harnesses have not been addressed in the proposed amendments to CMVSS 213. As a consequence, their sale in Canada, at least in the immediate future, will be precluded. This is not meant to imply that all or any such assemblies are necessarily unsafe. On the basis of visual examination, the performance of some appears satisfactory. Others, however, have shown a tendency to load the abdomen of the test dummy under certain test conditions. Unfortunately, performance criteria which would permit an objective assessment of injury potential to the abdomen presently do not exist. Given the proven effectiveness of other forms of restraint presently available for children, it was felt prudent to exclude all child harness systems until an appropriate test procedure can be developed.

Further extension of the limits of protection afforded to restrained children will require ever increasing attention to be paid to side impact protection. The more significant advances in this area will likely be brought about through improvements in the design of the vehicle structures themselves, both to the front and sides. It is likely that the protection of infants and small children could be further enhanced through improvements in the design of infant carriers and child restraints. However, efforts in this area will be hampered for some time to come owing to the absence of injury tolerance and biomechanical data on children.

Restraint use laws have rendered accurate assessment of restraint system effectiveness difficult owing to the extent to which restraint use is now misrepresented in accident reporting. Assuming that the accident experience of restrained children is not appreciably different from that of unrestrained children, available Canadian accident data suggest that the likelihood of serious injury or death can be reduced by some 60-75% through the use of child restraint systems and seat belts.

Many concerns have been raised in the past regarding the suitability of seat belts as a means of restraining children. These concerns continue to be shown to be unfounded on the basis of the injury experience of children. As far as could be determined from the Canadian accident data, the reductions in the incidence of serious injury or death observed among children restrained by seat belts equalled or surpassed those observed among the adult population.

Canadian experiences to date in the area of seat belt legislation indicate that, at minimal enforcement levels, seat belt use by adults tends to stabilize at the 40-50% level. Given the close dependence of child restraint use on parental belt use it is perhaps not surprising that usage rates among children in jurisdictions with seat belt legislation have also stabilized at approximately the same level. Previous work undertaken by Transport Canada has found the periodic implementation of Selective Traffic Enforcement Programs (STEP) represents a practical and effective method of increasing seat belt usage among drivers to the 75-80% level in jurisdictions with seat belt legislation [19]. These programs normally involve a period of intensified police enforcement of a specific offence (e.g. non-use of seat belts) in combination with mass media publicity on the program and public education on the rationale for the program. Such programs should prove to be equally effective in terms of increasing restraint use among children. The scope of these programs could be broadened to address other issues relevant to the protection of children such as the proper installation and use of infant and child car seats.

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NCLUSIONS

1. Canadian evidence suggests that the risk of serious injury or death to a front seat car occupant is reduced by 40% - 55% through the use of contemporary three-point seat belts.

2. Use of a lap belt by rear seat occupants reduces the likelihood of death by some 20% - 30% in the case of adults, by at least some 40% - 50% in the case of children.

3. The data suggest that three-point seat belts have a higher effectiveness in frontal collisions than in non-frontal collisions. The reverse appears to be true for lap belt systems.

4. Lap belts and three-point seat belts afford similar level of effectiveness in non-frontal impacts.

5. In frontal impacts, the risk of fatal injury to children seated in the rear of passenger car is reduced by at least 50% through the use of lap belts.

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Road Safety | Sécurité routière

LEAFLET TP 2436 FEUILLET

THE 1985 NATIONAL CHILD RESTRAINT USE SURVEY

The second National Child Restraint Use Survey was conducted in October/November, 1985, in conjunction with the National Seat Belt Use Survey. A total of 12,166 children under age 16 were observed travelling in private automobiles. The survey was conducted over a seven day period, between 7 A.M. and 5 P.M., at 130 sites across Canada. Only children in vehicles stopped for red lights were observed. For each child the following observations were recorded: type of occupant restraint (i.e. infant carrier, child seat, booster seat, seat belt); whether the restraint system was used properly (i.e. seat belt, shoulder harness, tether strap fastened as required); age; seating position; and the driver's seat belt use.

Table 1 shows that 46% of the children were seated in restraint systems appropriate to their ages. Appropriate restraint system was defined as follows: under 1 year of age - infant carrier or child seat; 1 to 4 years - child seat, booster seat, seat belt; 5 to 9 years - booster seat or seat belt; 10 to 15 years - seat belt. As presented in Table 2, proper use of child restraints was determined to be 75% for those children who were seated in child restraints appropriate to their ages. Proper use was defined as follows: infant carrier - seat belt and shoulder harness fastened; child seat - seat belt, shoulder harness and tether strap fastened; booster seat - seat belt fastened. The overall results given in Table 3 show that approximately one-third of the children observed were properly secured in child restraint systems appropriate to their ages. For children under 5 years of age, however, the overall proper use percentage was only 22%.

Further results of the survey include analysis of child restraint use by driver's seat belt use and community size and seating position by age of child.

For further information about the survey write to :

Road Users Division
Road Safety Directorate
Transport Canada
Place de Ville
Ottawa, Ontario
K1A 0N5

McGILL UNIVERSITY AUTOMOTIVE SAFETY RESEARCH PROJECTS

A. Lloyd Thompson
Mechanical Engineering Department
McGill University
Montreal, Que. Canada
H3A 2K6.

A copy of paper presented at Amalfi, Italy, at a course given at ICTS May 30/June 4, 1983, published as Proceedings "The Biomechanics of Impact Trauma" in 1984.

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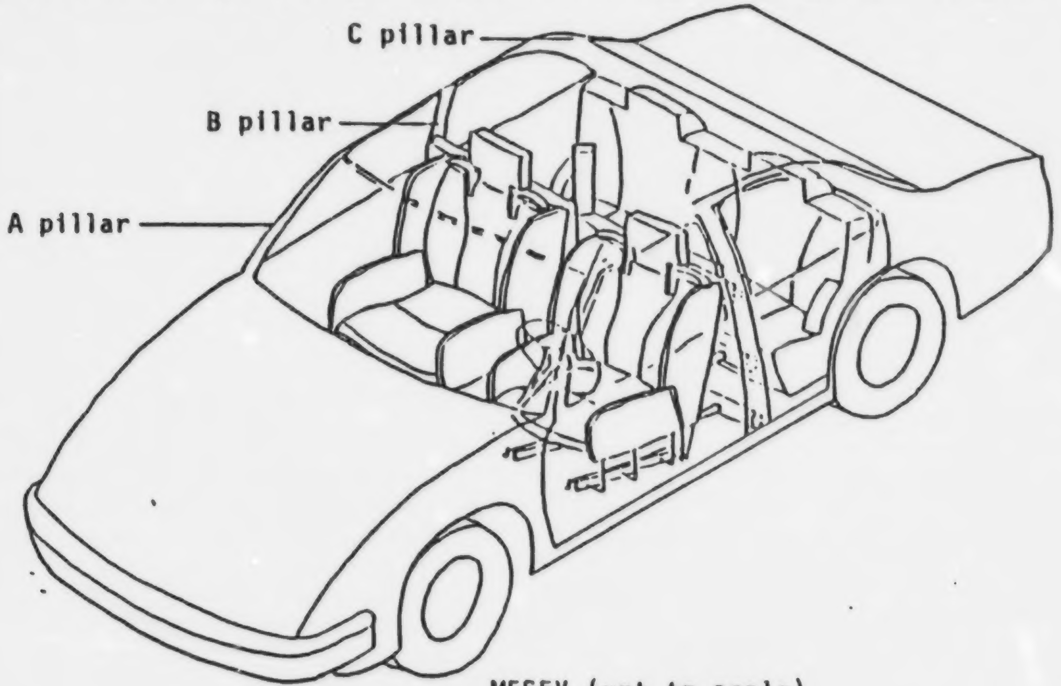
Current occupant restraint systems, when properly used in vehicles, have saved many lives and reduced injuries during automotive collisions and will continue to be very beneficial, but improvements are needed urgently. Part of the program at McGill University is concerned with the development of relatively simple and inexpensive devices which will indicate more positively whether the occupant was really wearing the restraint system properly at the time of a collision and what load and rate of loading of the belt was experienced by the occupant. Provisions are made for a better estimate of the speed of the vehicle before a collision and the rate and direction of deceleration. Recommendations and designs for the McGill Experimental Safe and Economical Vehicle (MESEV) are presented.

CURRENT OCCUPANT restraint systems when properly used in vehicles have saved many lives and reduced injuries during automotive collisions and will continue to be very beneficial. However, there are an increasing number of references (11-17) in the literature indicating that improvements in restraint systems are needed and various programs have been initiated and reported on. Garth and Herbert (11) have presented an excellent review of the situation in Australia and elsewhere and as in the past attention should always be paid to Australia for the implementation of improvements in restraint systems. Experience gained in the McGill Automotive Collision Investigation Project (MACIP) (1-9) over the past thirteen years has shown that there is a great need for relatively simple and inexpensive devices in vehicles which would indicate more positively whether the occupant was really wearing the restraint system properly at the time of the collision and what load and rate of loading of the belt was experienced by the occupant. It would also be desirable to have a better estimate of the speed of the vehicle before the collision and the rate and direction of deceleration of the vehicle and the occupants.

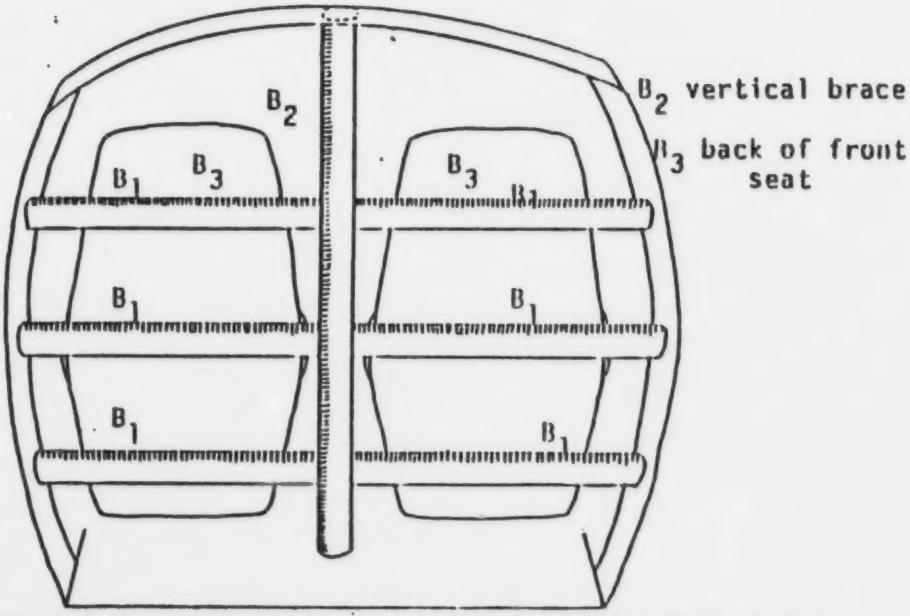
The Ultimate Objectives of this project are:-

1. to attempt to find a method of persuading more people to use the present type of seat belts when riding in a vehicle.
2. to provide better quantitative information for the study of vehicle collisions on the relationship between the characteristics of the crash situation (i.e. speed before impact, change of speed, belt load on occupant, etc.) and resulting injury if any.
3. to provide data which will aid in the design and construction of an improved occupant restraint system and seat. When this is used in a compact vehicle with improved energy absorbtion characteristics it will afford better protection for the occupant than at the present for vehicles in the case of a frontal crash in excess of 64 km per hour (40 miles per hour) or a side collision in excess of 40 km per hour (25 miles per hour). The overall economical and societal benefits will of course be considered. The proposed improved seat and occupant restraint system will also be beneficial when used in larger vehicles, etc.

Figure 10 Schematic of McGill Experimental Safe and Economical Vehicle


C pillar
B pillar
A pillar

MESEV (not to scale)


B2 vertical brace
B3 back of front seat
B2
B1
B3
B3
B1
B1
B1
B1
B1

B section of framed internal bracing to assist in protecting vehicle occupants in the event of a side collision.

Use appropriate bracing also at A & C pillar positions

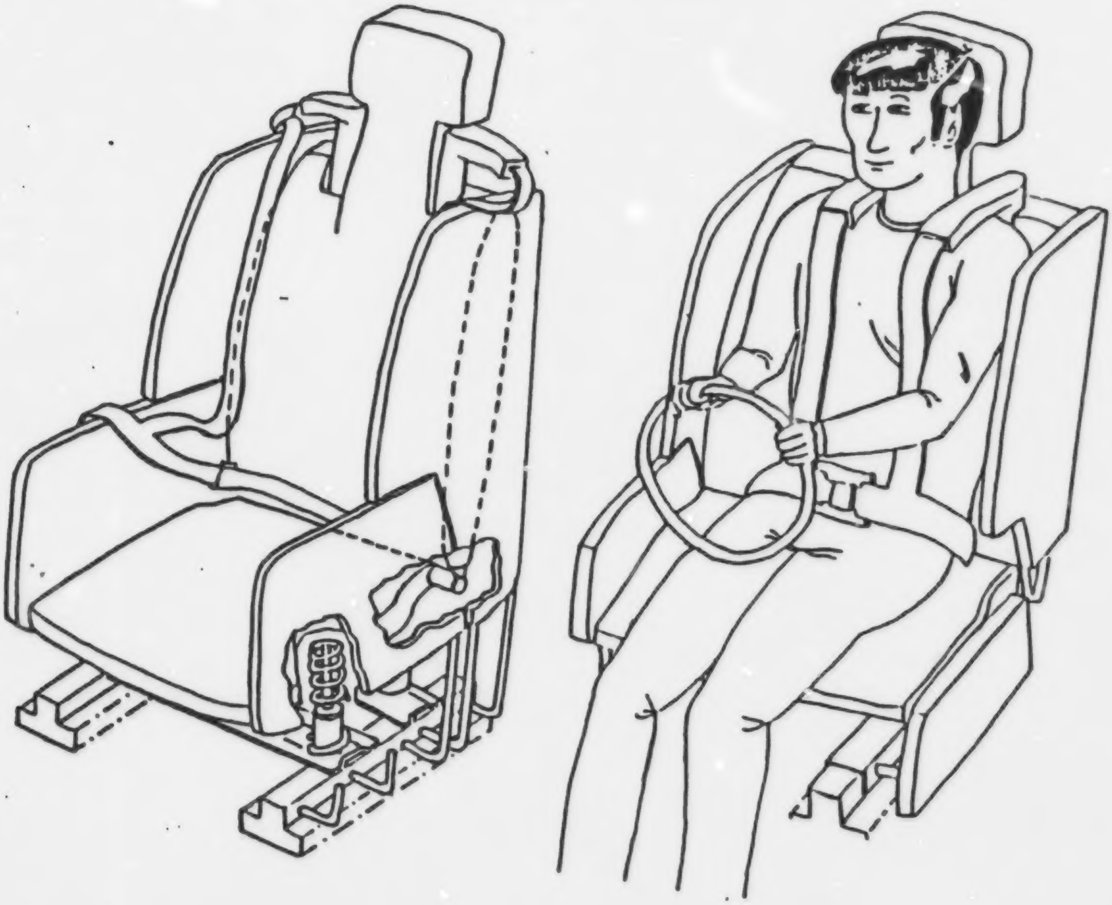
FRONT
↑
REAR

B_1 and B_2 padded (to reduce impact injury) Crumple tubes to enhance protection from side impacts.

Description of Schematic of Proposed McGill Safety Vehicle Seat

Figure 10 (cont'd)

1) Seat floor anchors to break away on direct impact by intrusion of colliding medium.
2) Seat belt inertial reel locking mechanism fastened onto bottom of seat, not onto car frame.
3) Seat to be rigid with pneumatic cylinders and/or large coil springs under the seat for ride comfort.
4) Lower protective panel adjacent to door to slide downwards automatically when door is opened to allow entry or exit of occupant.
5) Upper door side protective panel to swing outwards automatically when door is opened.



Description of Schematic of Proposed McGill Safety Vehicle Seat (continued)

6) Guide for Seat Belt to swivel about point shown.

7) Show lap belt either as going in to center of rear seat or at sides of rear of seat.

8) The head rest should be wider than shown in the diagram. It should be high enough so that the head of a person as represented by a 90th percentile anthropometric dummy (approximately 6 feet 2 inches (185 cm) in height) will be supported satisfactorily in a rear end collision or in a belt rebound situation.

9) Make provisions in the design and manufacturing of the seat to ensure rapid exiting by or removal of occupant after a severe collision.

PRELIMINARY REPORT

MERCEDES-BENZ
SUPPLEMENTAL RESTRAINT SYSTEM

TO BE DELIVERED AT THE
MINISTRY OF TRANSPORT CANADA

MARCH 25 - 26, 1987

PUBLIC FORUM ON PASSENGER CAR
OCCUPANT RESTRAINT

BY G.M. HESPELER

AT MERCEDES-BENZ, SAFETY IS AN INTEGRAL PART OF THE ENTIRE ENGINEERING PROCESS. BOTH ACTIVE SAFETY -- THAT IS, ACCIDENT AVOIDANCE -- AND PASSIVE SAFETY -- OCCUPANT PROTECTION -- HAVE LONG BEEN MAJOR PRIORITIES IN THE DESIGN OF MERCEDES-BENZ VEHICLES. IN BOTH OF THESE IMPORTANT FIELDS, WE HAVE TAKEN A "SYSTEMS APPROACH" INCORPORATING MANY INDIVIDUAL ELEMENTS THAT EACH CONTRIBUTE AND COMBINE TO ACHIEVE THE DESIRED RESULT.

SAFETY BELTS

FORTY YEARS AGO, RESEARCH AND DEVELOPMENT BEGAN ON WHAT HAS PRODUCED THE DESIGN OF THE CURRENT MERCEDES-BENZ THREE-POINT SAFETY BELT SYSTEM WHICH INCLUDES SUCH FEATURES AS:

- CONTINUOUS LOOP LAP-SHOULDER BELT

- Belt buckle anchorage on the seat to assure proper belt location across the lap in all seating positions.

- Adjustable shoulder belt upper anchorage to allow vertical placement of the anchorage location to be selected according to shoulder height.

- Emergency locking retractors, sensitive to vehicle and webbing acceleration.

- Three-point belts in the outboard seating positions in the rear seat since 1973.

The most recent design combines the locking retractor with a belt tensioning mechanism (ETR) that rolls up about 10 cm of webbing at the beginning of an impact thereby decreasing the forward movement of the occupant.

Another contribution to comfort and convenience is the belt extender in coupes which brings the belt forward within easy reach of the occupant and returns to its rest position when the seat belt is buckled.

Even the most carefully developed seat belt system is not effective if not used - a fact that initiated in the USA the idea of automatic restraints which provide protection without requiring action by the vehicle occupant, such as fastening a seat belt. As a result, many different systems

OF AUTOMATIC OR PASSIVE SEAT BELTS HAVE BEEN PROPOSED, BUT ONLY VERY FEW ARE OFFERED IN THE MARKET PLACE, USUALLY AS OPTIONAL EQUIPMENT.

AIR BAGS

AN IMPORTANT ASPECT OF THE DEMAND FOR AUTOMATIC RESTRAINTS WAS THE CONCEPT OF INFLATABLE RESTRAINTS, OR AIR BAGS.

IN 1966, DAIMLER-BENZ MANUFACTURER OF MERCEDES-BENZ VEHICLES STARTED ITS OWN AIR BAG DEVELOPMENT PROGRAM. AFTER TESTING SYSTEMS WHICH USED PRESSURIZED OR LIQUID GAS FOR BAG INFLATION, WE DECIDED TO USE SOLID PROPELLANT AS A DEPLOYMENT AGENT AND INITIATED THE DEVELOPMENT OF A SOPHISTICATED ELECTRONIC SENSOR.

AFTER 14 YEARS OF DEVELOPMENT, THE DRIVER AIR BAG SYSTEM WAS RELEASED FOR PRODUCTION AND OFFERED AS AN OPTION IN THE EUROPEAN MARKET (DURING MODEL YEAR 1981) AND THREE YEARS LATER IN THE NORTH AMERICAN MARKET (IN MODEL YEAR 1984). MERCEDES-BENZ INTRODUCED THE DRIVER AIR BAG INTO THE MARKET PLACE WITH A VERY CLEAR STATEMENT: AN AIR BAG IS SUPPLEMENTAL TO THE ACTIVELY FASTENED THREE-POINT SAFETY BELT. SAFETY BELTS ARE, AND CONTINUE TO BE, THE FUNDAMENTAL AND ESSENTIAL OCCUPANT-RESTRAINING DEVICES IN ALL VEHICLE CRASH MODES. THEREFORE, WE PURPOSELY CALL THIS EQUIPMENT A "SUPPLEMENTAL RESTRAINT SYSTEM (SRS)", A TERM NOW WIDELY USED BY ALMOST ALL MANUFACTURERS AND OCCUPANT SAFETY GROUPS.

FOR MODEL YEAR 1986, THE SYSTEM BECAME STANDARD EQUIPMENT IN ALL MERCEDES-BENZ CARS SOLD IN NORTH AMERICA. BY THE END OF FEBRUARY 1987, A TOTAL OF 250,000 CARS WITH SRS WERE DELIVERED, OF THESE 170,000 IN THE U.S AND 4400 IN CANADA. EXCEPT FOR A FEW CARS DAMAGED BY ACCIDENTS AND SCRAPPED, ALL ARE STILL IN OPERATION ON PUBLIC ROADS. THIS MEANS A TOTAL EXCEEDING 270,000 VEHICLE YEARS OF OPERATION OR - IF WE ASSUME AN ANNUAL MILEAGE OF 10,000 PER CAR - IN EXCESS OF 2.7 BILLION MILES DRIVEN.

OUR FIELD EXPERIENCE HAS SHOWN:

- INADVERTENT DEPLOYMENTS DO NOT OCCUR DURING NORMAL CAR OPERATION (INCLUDING RUNNING OVER CURB STONES, POT HOLES, ETC.) OR DURING PROPER SERVICE AND REPAIR.

- MINOR SINGLE OR MULTIPLE FRONTAL IMPACTS, WHERE EITHER THE SEAT BELT OR THE ENERGY ABSORBING STEERING COLUMN PROVIDES ADEQUATE PROTECTION, WILL NOT TRIGGER THE AIR BAG, KEEPING IT AVAILABLE FOR POSSIBLY MORE SEVERE SECONDARY IMPACTS.

- EXCEPT FOR TWO REPORTED EJECTION CASES, IN WHICH THE SEAT BELTS WERE NOT USED, THERE HAVE BEEN NO HEAD INJURIES OTHER THAN MINOR FACIAL ABRASIONS.

LIMITS OF AIR BAG PERFORMANCE

IT HAS ALWAYS BEEN DEBATED - AND THE MERCEDES-BENZ INVESTIGATIONS INDICATE - THAT THE PROTECTIVE EFFECT OF AIR BAGS IS LIMITED.

AIR BAGS CANNOT PREVENT EJECTION IF THE SEAT BELT IS NOT WORN. FOR EXAMPLE: ONE CAR WAS INVOLVED IN A HEAD-ON ROLLOVER, AND THE UNBELTED DRIVER - DESPITE AIR BAG DEPLOYMENT - WAS EJECTED THROUGH THE SUNROOF OPENING AND KILLED BY HIS OWN CAR. ANOTHER CAR LEFT THE ROAD AT A VERY HIGH SPEED AND, FOLLOWING SEVERAL SEVERE SIDESWIPE CONTACTS WITH TREES, THE DRIVER'S DOOR WAS RIPPED OFF. CONTACT WITH A STUMP CAUSED SEVERE UNDERCARRIAGE DAMAGE CAUSING THE TRIGGERING THRESHOLD TO BE REACHED AND THE AIR BAG DEPLOYED. HOWEVER, THE UNBELTED DRIVER WAS EJECTED AND SUSTAINED FATAL INJURIES.

THE MOST FREQUENT QUESTION CONCERNS INADVERTENT DEPLOYMENTS. TO THE BEST OF OUR KNOWLEDGE, THE INADVERTENT DEPLOYMENT OF A TOTALLY INTEGRAL MERCEDES-BENZ AIR BAG SYSTEM HAS NEVER OCCURED. IT HAS ALWAYS FUNCTIONED AS DESIGNED. ONLY IF THE SYSTEM'S INTEGRITY IS DISTURBED, DEPLOYMENTS OTHER THAN THOSE TRIGGERED BY AN ACCIDENT CAN OCCUR. FOR INSTANCE, DURING THE AFTERMARKET INSTALLATION OF A TELEPHONE, RADIO OR ANTITHEFT EQUIPMENT, WIRING HARNESSES HAVE BEEN DAMAGED BY A DRILL OR SCREW CAUSING AN IMMEDIATE OR DELAYED SHORT CIRCUIT, RESULTING IN DIRECT CONTACT OF A POWER CABLE TO AN IGNITER CABLE.

DRIVER EXPERIENCE REPORTS, MARKET ACCEPTANCE AND GAS GENERATOR DISPOSAL

A. SOME DRIVERS PROVIDED SUBJECTIVE JUDGEMENTS ON THEIR PERSONAL EXPERIENCE WITH AIR BAGS. THE MAJORITY OF THE COMMENTS WERE POSITIVE, SOME COMPLAINED ABOUT DUST, SMOKE AND NOISE.

B. THE MARKET ACCEPTANCE OF AIR BAGS AS STANDARD EQUIPMENT IN ALL MERCEDES-BENZ MODELS SOLD IN THE NORTH AMERICAN MARKET, BEGINNING WITH MODEL YEAR 1986, HAS NOT YET BEEN DETERMINED.

C. TO HELP ASSURE PROPER DISPOSAL OF GAS GENERATOR UNITS IN VEHICLES BEING SCRAPPED, WE HAVE PROVIDED, FREE OF CHARGE, 5000 CONNECTORS TO THE AUTOMOTIVE DISMANTLERS AND RECYCLERS ASSOCIATION, TO ENABLE ITS MEMBERS TO SAFELY TRIGGER THE UNITS BY REMOTE CONTROL IN PREPARATION FOR SHREDDING OF CARS EQUIPPED WITH AIR BAGS. WE ARE WORKING ON THIS QUESTION IN CLOSE COOPERATION WITH THE AUTOMOTIVE DISMANTLERS AND RECYCLERS ASSOCIATION, SAE AND MORTON THIOKOL, ONE OF THE MANUFACTURERS OF GAS GENERATORS.

IN CONCLUSION, OUR EXPERIENCE THUS FAR HAS BEEN THAT THE SYSTEM FUNCTIONS AS DESIGNED.

CHARLES H. MILLER
VEHICLE SAFETY RESEARCH TEAM
TECHNICAL UNIVERSITY OF NOVA SCOTIA

1987/3/23

OCCUPANT RESTRAINT SYSTEMS

• GENERAL COMMENTS

The publication of theTransport Canada report, "Background Paper on Motor Vehicle Occupant Protection in Canada", is most welcome and very timely.

Currently, when eight of the ten provinces have legislated mandatory use of motor vehicle restraints, and the remaining two have publically announced their intention of proceeding with similar legislation, it is apparent that the general negative reaction to legislation has substantially decreased from that which existed only a few years ago.

However, there are disturbing qualitative signs that the expected decrease in highway accident deaths has not been proportionate to the seat–belt usage increases, as was expected in many quarters.

Three subjective observations are immediately apparent from a field investigator's point of view, and these are noted below.

• NON–USAGE BY ACCIDENT–PRONE OCCUPANTS

A large proportion of those people involved in roadway accidents, who were killed or severely injured, were not wearing their seat belts prior to the accident in which they were involved. This is clearly noticable in from field investigations; it is important that the available pertinent statistical data be analysed on both a provincial and national basis at the earliest opportunities.

This anomoly is also noted in the Transport Canada report in Section 4.2.1.

• IMPROPER ADJUSTMENTS

Motorists are NOT, in general, wearing their seat belts properly adjusted; this leads to unnecessary deaths and unnecessarily serious injuries. There is a general ignorance by the public in respect to their ability to relate to the physics involved in an accident and, as a result, an apathy has developed in relation to the necessity of wearing the restraint system properly adjusted and positioned.

From field observations, the prevalence of motorists wearing their belts with excessive slack, improper positioning and with improper maintenance of belt integrity (eg little care in slamming a door on the belt), is nothing short of frightening, at least as far as Nova Scotia and P.E.I. are concerned.

• DISCOMFORT & DISGUST

We have found, that as an accident investigation team, we are often called upon "as a last resort" by motorists who are both frustrated and disgusted with attempts to wear their seat belt restraints properly, but cannot do so because they do not fit within the "95 percentile envelope" of humanity. This happens so often that we have begun to doubt both the linearity of percentages and the physical conformity of Maritimers.

Unfortunately, it is almost invariabily found that these very people are the most conscientious ones in wishing to both obey the laws and to provide protection to themselves and their passengers, yet they feel ignored by their dealers, the industry in general and by the government.

This problem must be addressed quickly and effectively. It is our personal belief that this problem is the single most limiting factor in reaching 90% usage rate.

- **COMMENTS (TC Paper Sequence)**
  - **Section 2 – DEFINITIONS**

The definition, "Automatic restraint system, " apparently does not include any distinction between quasi–static and dynamic activation, ie whether a passive restraint is included as being automatic (as in seat–belt wraparound when door is closed) or if the system definitely requires dynamic activation (as with acceleration–activated air cushions or seat belts).

If the existing definition does not exclude "passive restraints", then are passive restraints included by implication as a subset of automatic restraint systems? We are confused as to whether this was an intended inclusion or an inadvertant omission, or more probably, a misinterpretation on our part. We would be happy to receive some clarification on this to remove the ambiguity.

Also, are we correct in interpreting the "manual seat belt" definition as not explicitedly excluding dynamic activation in conjunction with manual initial fastening (eg, as with the dynamically activated passenger's restraint in some Mercedes Benz vehicles)?

- **Section 3 – CURRENT STANDARDS**
  - 3.1 – CANADIAN POLICY

We fully agree with the report statement that the mandate on installation of automatic restraint systems should be deferred until sufficient data are available to assess the effectiveness, cost and reliability in mass production and in the Canadian context. We also agree that ongoing review and upgrading of performance–governing of automatic restraint systems is required.

Further, we most definitely agree with maintaining the current policy of promoting the use of manual seat belts.

  - 3.2 – U.S. POLICY

We believe that Canada should take cognizance of the U.S. policies on restraints, but should not feel obliged in any way to conform to these policies if this means that Canadian safety standards, under Canadian driving conditions, will be compromised in any way by the adoption of U.S. standards or their equivalent.

- **Section 4 – FACTORS**
  - 4.1 – INJURY CRITERIA

We fully agree with statement ," However, it is apparent from fundamental considerations, accident data and laboratory testing that the three existing injury criteria* used for vehicles equipped with automatic restraints are seriously inadequate for such a purpose."
*(HIC, chest deflection and femur load).

We feel that the Transport Canada research, aimed at the development of a set of injury criteria which will provide a basis for more consistent and effective regulation of the performance of occupant protection systems, is very important indeed, especially so in relation to long–term safety considerations.

Hopefully, a more immediate short–term improvement in occupant protection can be made by initiating substantial revisions to the lap–belt geometrical standards. Our own field results of accident investigations clearly emphasize the the need for substantially better manufacturing regulations of lap–belt configurations to ensure correct lap–belt fit, to reduce not only serious abdominal injuries but also to reduce debilitating spinal–cord injuries.

• 4.2 – MANUAL SEAT BELT USE

• 4.2.1 – CURRENT MANUAL BELT USE

Seat belt usage in N.S. jumped dramatically (to the highest in the country) with the adoption of legislation, despite considerable long–standing opposition to imposed legislation, and sporadic court challenges after the fact.

From field investigations in Nova Scotia there is positive and substantial evidence that the non–users of seat belts are the very persons most likely to be involved in serious traffic accidents. This observation is in direct agreement with the statement in Section 4.2.1 of the Transport Canada report.

This inverse correlation is obviously of major importance, but how this sector of the driving public can be influenced is not at all clear to us.

• 4.2.2 – PROMOTION OF SEAT BELT USE

We believe that the improved effectiveness of manual seat belt use lies in ...

(1) substantial improvements in seat belt design for controlled energy absorption and inherent limiting of slack, all concurrent with comfortable wearing,

(2) continued and improved equipment performance legislation,

(3) continued and enhanced public education respecting use, proper adjustments and proper maintenance of restraint gear.

• 4.2.3 – Future Use of Manual Belts

• 4.3 – Occupant Restraint Effectiveness Estimates

• 4.4 – Consumer acceptance of Automatic Restraints

• 4.5 – Cost Effectiveness of Various Protection Systems

• 4.6 – OTHER CONSIDERATIONS

4.6.1 – Provincial Concerns

4.6.2 – MOTOR VEHICLE INDUSTRY

As an accident investigation team it is qualitatively obvious to us that North American designed vehicles show little initiative on the part of the designer-manufacturer to exceed the minimal governmentally imposed safety standards. Many European and Asiatic vehicles come with standard equipment, three-point belt restraint systems for the rear seats. In contrast, most dealers of North American vehicles do not even know that the three-point mounting positions even exist by law, let alone know where they are, how much they cost, how many months it will take to receive them and how to install them.

Styling changes still apparently take precedence over safety interiors and false hubcaps still take precedence over anti–locking brakes. There are obviously many nominal excuses that can be made by industry to explain its non–innovative attitude in relation to safety design, but very few realistic or valid ones.

4.6.3 – CHILD RESTRAINT USE

TETHER STRAPS

As stated elsewhere, the general public does not recognize the extent of the inertial forces imposed on a vehicle occupant during a collision process. The current ambiguity in relation to the recommended use of tether straps unfortunately does not encourage safer practices.

We have been flooded with queries by concerned parents requesting help in fitting or adapting child seats to station wagons, vans hatchbacks and even ordinary sedans. Manufacturers' provisions on this problem are far from adequate, in terms of availability of information, availability of the minor components required and dealer cooperation. Solutions are not difficult, but they do require official sanction and full–stream cooperation.

Temporary use of child seats in "grand–dad's car" remains a very valid continuing problem.

3-POINT RESTRAINT FASTENING

As noted in the report, the normal emergency locking retractors do not adequately constrain the development of belt slackness, nor do the continuous loop systems function adequately without locking clips. Here again, the public is generally unaware that dangers exist and do not even know of the existence of locking clips.

Since there is a genuine concern by the adult public for their childrens' safety, even more so than for themselves, we most strongly urge close and prompt attention to these problems.

As stated so well in the report, the introduction of automatic restraint systems will compound the problems associated with the use of child seats.

4.6.4 – REAR SEAT OCCUPANTS

The Transport Canada report states the situation with respect to rear-seat occupant protection vey well indeed and we would fully agree with these statements.

We have also noted additional substantial concers in this area in Section4.6.2 above, titled "Motor Vehicle Industry".

Additionally, certain media attention has distorted the benefits derived from even the minimal rear-seat lap belts by concentrating on the injuries suffered by occupants, to the virtual exclusion of the life-saving features involved.

• SUMMARY

At this time, legislation of seat-belt restraints has clearly become recognized as a positive and desirable action on the part of most of the ten provincial governments. Many lives have been saved and many more injuries reduced in severity than would otherwise have occurred had legislation not been passed.

Nevertheless many potential improvements remain outstanding. In our opinion these are as noted in the Transport Canada paper and in the above discussion. The major points are summarized below:

(1) Increased restraint usage is required, particularly by the "accident prone" portion of the public which tends to correlate strongly with the non-users of restraints.

(2) Substantial design improvements can and should be made in manually operated belt systems.

(3) Manufacturers should show more initiative and inovation by aiming higher than minimal adherence to government safety standards.

(4) Manufacturers' dealers should be much more cooperative in meeting the complaints and legitimate safety concerns raised to them by individual members of the public.

(5) A massive educational program should be undertaken to explain the necessity for CORRECT adjustment and care of all restraint systems.

(6) Considerably more attention must be paid, particularly by industry, to design and service details to allow proper installation and use of child restraints.

(7) Functionally correct three-point attachment of rear seat restraints should be universally adopted by North American manufacturers.

(8) Action should be taken as quickly as possible by government and industry to ensure better and more comfortable seat-belt fits than those which currently exist. Retrofit capability is highly desirable.

(9) Automatic restraint systems should be considered as supplements to, as well as replacements for, manual systems.

(10) Automatic restraint systems should be fully investigated but their adoption not be based on U.S. whims and/or laws.

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C. Robert Baird
Deputy Coordinator

Charles H. Miller
Coordinator

Vehicle Safety Research Team
Technical University of Nova Scotia

1987/3/22

PHONE 454-9621
or
453-5525

NOVA SCOTIA SAFETY COUNCIL
2745 DUTCH VILLAGE ROAD, SUITE 106
HALIFAX, NOVA SCOTIA
B3L 4G7

MEMORANDUM

TO: Dr. Charles Miller

FROM: George Currie
Executive Director

DATE: March 10, 1987

SUBJECT: PUBLIC FORUM ON PASSENGER CAR OCCUPANT RESTRAINTS, MARCH 25-26, 1987

The following observations, comments and recommendations are recorded for presentation to the noted assembly. As you know, we do not have available funds to send a representative to Ottawa to attend the Forum. We appreciate your willingness to present this report on our behalf.

Observation: The Nova Scotia Safety Council receives complaints from the general public concerning the poor fit of front seat safety belt assemblies. Specifically, we hear from people of small physical stature who state that no matter how they try to adjust the belt, the shoulder strap cuts across their neck or even the left side of the head. These persons are bitter. They feel that persons in authority are deliberately disregarding their plight.

Comment: (1) The Nova Scotia Safety Council believes persons so affected have a legitimate complaint. They point out that the law mandates seat belt usage but they are not looking for an excuse to avoid use of seat belts. It is apparent that they are genuinely concerned for their safety. They want to use the complete 3 point seat belt assembly but they are constantly confronted with the stated problem.

(2) If a person so affected should be involved in a collision, it is reasonable to suspect that they could be injured needlessly because of the ill-fitting shoulder strap.

(3) In the case of drivers so affected, it is reasonable to assume that he or she will be distracted from the driving task. This condition could lead to the cause of a collision.

...2

Recommendation: The Nova Scotia Safety Council asks Transport Canada to initiate immediate action to overcome the problem.

Thank you.

Yours sincerely,

G. M. Currie
Executive Director

GMC/jay

MOTOR VEHICLE MANUFACTURERS' ASSOCIATION

25 Adelaide St. East
Suite 1902
Toronto Ontario
Canada M5C 1Y7
Tel (416) 364-9333

A
STATEMENT
BY THE
MOTOR VEHICLE MANUFACTURERS' ASSOCIATION
FOR PRESENTATION
AT THE
TRANSPORT CANADA PUBLIC FORUM
ON
PASSENGER CAR OCCUPANT RESTRAINTS

MARCH 25 - 26, 1987

Members
American Motors (Canada) Inc
Chrysler Canada Ltd
Ford Motor Company of Canada, Limited
General Motors of Canada Limited
Mack Canada Inc
Navistar International Corporation Canada
Paccar of Canada Ltd
Volvo Canada Ltd
Western Star Trucks Inc

Introduction:

The MVMA is pleased to participate in this public forum on passenger car occupant protection sponsored by Transport Canada. Our membership includes the nine domestic motor vehicle manufacturers in Canada, namely:

- American Motors (Canada) Inc.
- Chrysler Canada Ltd.
- Ford Motor Company of Canada, Limited
- General Motors of Canada Limited
- Mack Canada Inc.
- Navistar International Corporation Canada
- Paccar of Canada Ltd.
- Volvo Canada Ltd.
- Western Star Trucks Inc.

Representatives from our member companies are also pleased to participate in this event not only to discuss issues and display some new developments in restraint systems but also to listen to public perception and attitudes respecting this very important issue.

The Association's remarks which follow are brief and general in nature. They are intended to only supplement the views of our individual member company representatives and serve to provide an industry overview on the subject of passenger car occupant restraints.

Industry-Government Interface:

Since it's inception in 1969, the Transport Canada Road Safety and Motor Vehicle Regulation Directorate has evolved to be the focal point in the federal government for all automotive technical matters including the development of safety standards for new motor vehicles at point of manufacture in, or importation to Canada, and the development of research programs and the correlation of valuable research data.

The relationship between Transport Canada and the vehicle manufacturers has been a cooperative and positive one. Each is working toward the common objective of improved public safety in the use of automobiles.

The objective of achieving a higher level of safety is one to which the motor vehicle manufacturers subscribe fully. Long before the enactment of motor vehicle safety legislation or government involvement, a great deal of research and development had been undertaken by manufacturers in pursuit of this objective. In the spirit of cooperation manufacturers have shared, to the extent possible, the results of long years of research to assist Transport Canada in the development of appropriate motor vehicle safety standards. The interaction between Transport Canada and the motor vehicle manufacturers has served well to promote the advancement of knowledge regarding vehicle crash performance, occupant protection, and innovative ways of addressing important vehicle safety issues vis a vis the Canadian Motor Vehicle Safety Standards.

The degree to which the motor vehicle industry is rationalized between Canada and the U.S. is an important consideration when developing safety standards. Development of unique Canadian standards, or standards which are not compatible between Canada and the U.S., poses some very serious concerns i.e.) assembly plant complexity management, additional production costs, which inturn are passed on to vehicle purchasers, and reduced consumer choice where a model does not comply with the standards in effect in the country of destination. Of course we are not suggesting that these are reasons for failing to address any unique Canadian requirements, but rather the MVMA is working with Transport Canada to ensure that the standards which are developed fully meet their objectives while remaining compatible in both Canada and the U.S. This will raise the level of safety, reduce vehicle retail costs, and maximize the availability of model lines in U.S. and Canada - all of which is to the benefit of Canadian motorists.

Directions in Occupant Restraint Development:

The automotive industry has undertaken a great deal of research and development, including extensive crash performance evaluation, at its own initiative and at its own cost. The result has been the development of many safety features including energy-absorbing steering columns, penetration-resistant windshields, benign interior compartments and safety belt systems, just to name a few. These developments have contributed to the progressive reduction in the rate of fatalities and injuries on our roads.

The vehicle manufacturers have continuously improved seat belt systems with the result that current systems are being seen by the public to be effective, convenient, and comfortable. More can and will be done.

An important part of this research and testing activity has been the development of automatic seat belts and air bag systems. The Transport Canada background paper which is the foundation for this forum succinctly summarizes the available evidence on the effectiveness and use of current three point manual belt systems, as well as, the cost-effectiveness and consumer acceptance of various proposed automatic occupant protection systems and automatic seat belts. We commend Transport Canada for this well-prepared background paper.

As the background paper properly notes, the excellent performance of manual three point belt systems is well supported by experimental and laboratory data, plus a large body of field accident data. To date, conclusions respecting the effectiveness of automatic restraint systems has been based primarily on laboratory testing and limited field accident data.

In the U.S., automatic restraints are presently mandated under a phase-in program. In Canada, some manufacturers are voluntarily offering driver side air bag systems as options and are considering production of automatic seat belt systems in the front outboard seating positions on limited car lines. The type of systems and the rate of introduction will be dependent on the field performance, and public receptiveness. Presently, manufacturers are working with Transport Canada to ensure the effectiveness of these systems, with out unnecessary design restrictions.

The cost of automatic restraint systems is dependent on the type and design, the capital investment, materials, and assembly plant complexity costs. Manufacturers are endeavouring to develop systems for maximum safety, comfort, and convenience. However, the debate continues respecting passive restraint system costs, especially air bag systems. U.S. NHTSA cost estimates for air bags, in our view, are underestimated.

While air bags may provide a further increment of safety in certain accident cases, manufacturers would not recommend the use of air bag systems without three-point belt systems.

Recent attention has been given to the potential for serious injury to persons wearing lap belts while seated in the rear seating positions of passenger cars. Notwithstanding the extreme severity of the collisions which have received attention and possible improper seat belt adjustment in these cases, most domestic car manufacturers have committed to voluntarily providing three-point seat belts for the rear outboard seating positions in their product lines. It is believed that this initiative is directionally correct in reducing the potential for serious injury.

Conclusions:

In all that has been said on this subject, the consensus is that increased use of safety belts will achieve significant reductions in fatalities and injuries in motor vehicle accidents.

Because of the uncontested value of belt use, we are convinced that this industry, government agencies, and all private sector groups interested in highway safety, including the insurance industry, have a responsibility to persist in and to expand efforts to increase belt use. We understand that the remaining two provinces in Canada without mandatory seat belt laws are planning implementation shortly. This will indeed raise seat belt usage rates overall.

MVMA members will continue their efforts to develop restraint systems that will assist in further reducing fatalities and injuries. The motor vehicle industry is also committed in its efforts to increase belt use through their individual company programs and in working cooperatively with Transport Canada.

* * *

Université de Montréal
Faculté de médecine
Département de médecine sociale
et préventive

LA CEINTURE DE SECURITE: SON RENDEMENT CHEZ DES GROUPES D'ACCIDENTS-OCCUPANTS HOMOGENES

Claire Laberge-Nadeau, M.D., M.Sc.
Urs Maag, Ph.D.
Robert Bourbeau, Ph.D.
Marie-Hélène St-Pierre, M.Sc.
Université de Montréal

Résumé:

Toutes les études réalisées dans le but d'évaluer le rendement de la ceinture de sécurité montrent l'efficacité de ce dispositif de sécurité. Toutefois, sur les accidents réels, le niveau d'efficacité attribué à la ceinture varie d'une étude à l'autre.

Objectif: Évaluer le rendement de la ceinture de sécurité en regard de la nature et de la gravité des blessures subies par différents groupes d'occupants impliqués dans des accidents présentant un degré d'homogénéité élevé entre eux (groupes d'accidents-occupants homogènes).

Sources de données et méthodes: L'échantillon est constitué de personnes impliquées dans des accidents survenus au Québec, entre le 1er mars 1978 et le 31 décembre 1981, et pour lesquels au moins un des occupants a fait une demande d'indemnisation auprès de la Régie de l'assurance automobile du Québec. Les dossiers manuscrits des réclamants et les fichiers informatisés de la Régie ont permis la codification des blessures en CIM-9 et leur classification en système AIS-80 et ISS. De plus, il a été possible de former des groupes d'accidents-occupants homogènes, ce qui constitue l'élément original de notre méthode de recherche. La création de ces groupes assure un certain niveau de contrôle quant à l'effet de nombreux facteurs externes pouvant interagir sur les blessures en même temps que celui de la ceinture de sécurité. C'est ainsi que d'un bassin d'environ 63,000 victimes de la route, nous avons obtenu un échantillon de 12,847 individus se répartissant dans 11 groupes d'occupants impliqués dans des accidents à un véhicule et dans 42 groupes d'occupants impliqués dans des accidents à deux véhicules.

Nos résultats: Pour l'ensemble des victimes occupants-avant impliquées dans des accidents à un et à deux véhicules, le port de la ceinture réduirait de 77% la proportion de tués parmi les non-ceinturés, diminuerait de 48% la proportion de blessés graves et augmenterait la proportion d'indemnes de 11%. Des résultats sont aussi donnés:

1) pour les collisions à deux véhicules, différenciant les véhicules lourds des légers, ceux qui surviennent en zone de haute vitesse et en zone de basse vitesse;
2) pour ceux impliquant un seul véhicule, pour les capotages, etc.

Ces résultats sont discutés avec ceux d'autres recherches publiées.

Dans une perspective de santé publique, ces résultats sont importants. Nous souhaitons que cette premières étude évaluative canadienne sur l'efficacité de la ceinture puisse convaincre nos concitoyens à boucler leur ceinture.

Communication à Forum public sur les systèmes de retenue des occupants des véhicules automobiles; Ottawa, 25-26 mars 1987 organisé par Transport Canada.

Pavillon Marguerite d'Youville
2375, chemin de la Côte Ste-Catherine
bureau 6080
C.P. 6128, succursale A
Montréal (Québec)
H3C 3J7

Telex 05826852 TELEXPLUS MTL 1223
Fax (514) 384-3345 code 1223

LA CEINTURE DE SÉCURITÉ : SON RENDEMENT CHEZ DES GROUPES D'ACCIDENTS-OCCUPANTS HOMOGÈNES

Claire Laberge-Nadeau, M.D.
Faculté de médecine
Université de Montréal
Montréal, Québec

Robert Bourbeau, Ph.D.
Département de démographie
Université de Montréal
Montréal, Québec

Urs Maag, Ph.D.
Département d'informatique et recherche opérationnelle
Université de Montréal
Montréal, Québec

Marie-Hélène St-Pierre, M.Sc.
Centre de recherche sur les transports
Université de Montréal
Montréal, Québec

INTRODUCTION

La ceinture de sécurité n'est pas une nouvelle invention : en 1885 on la voit apparaître pour la première fois (Johannessen, 1984). Depuis, de grandes améliorations y ont été apportées. Les systèmes de retenue ne peuvent empêcher la collision; mais ils peuvent tout au moins en atténuer les conséquences en diminuant le risque de contacts violents entre l'occupant et le véhicule. De plus, ils permettent d'optimiser la distance de décélération au moment de l'impact et de prévenir l'éjection du véhicule, ce qui réduit la mortalité et la gravité des blessures.

A l'Université de Montréal, nous avons entrepris une recherche pour évaluer l'efficacité de la ceinture de sécurité sur des accidents réels survenus au Québec entre le 1er mars 1978 et le 31 décembre 1981.

L'objet de cette recherche est d'évaluer le rendement de la ceinture de sécurité en regard de la nature et de la gravité des blessures subies.

De nombreuses études, effectuées en Australie, aux États-Unis et dans plusieurs pays européens, ont évalué le rendement de la ceinture de sécurité. Toutes ces études s'entendent pour montrer l'efficacité de ce système de retenue. Essentiellement, elles mesurent le nombre et la gravité des blessures chez les ceinturés et les non-ceinturés et elles comparent les deux groupes. Toutefois, sur des accidents réels, le niveau d'efficacité attribué à la ceinture varie d'une étude à l'autre. Plusieurs facteurs peuvent expliquer ce phénomène : source de données différentes, qualité de données variable, utilisation d'échelles non uniformes pour quantifier la gravité des blessures et, peut-être surtout, la prise en compte d'un plus ou moins grand nombre de variables pouvant interagir avec la ceinture de sécurité sur la gravité des blessures (Reinfurt, Sylva and Seila; 1976; Evans, 1986). Sur ce dernier point, des études ont mis en évidence les principales variables à contrôler, ou du moins à prendre en compte, si on veut isoler l'effet réel du port de la ceinture de sécurité.

GROUPES D'ACCIDENTS-OCCUPANTS-HOMOGÈNES

Afin de cerner du plus près possible l'effet réel de la ceinture de sécurité, nous avons choisi une population d'analyse nous permettant d'assurer un certain niveau de contrôle face aux facteurs externes : il fallait obtenir, entre les goupes à comparer, un haut niveau d'homogénéité. C'est ce qui a présidé à la création de groupes d'accidents-occupants-homogènes.

Notre fichier de base est constitué de toutes les personnes impliquées dans un accident survenu au Québec entre le 1er mars 1978 et le 31 décembre 1981 et pour lequel au moins une personne a fait une demande auprès de la Régie de l'assurance automobile du Québec. C'est en fait le couplage du fichier de la Régie et des rapports de police correspondants qui identifie la population de base. Une étude de vérification de la qualité des données informatisées a précédé le jumelage et le choix des échantillons (Laberge-Nadeau et al., 1984). Dans une première étape d'homogénéisation, afin d'éliminer des forces d'impact moins contrôlables, un choix a été fait en fonction de certaines caractéristiques des accidents. Ainsi, par exemple, seuls les accidents n'ayant pas de deuxième événement ont été retenus. Les accidents impliquant un camion ont été exclus. Dans les accidents avec collision, seuls ceux impliquant exactement deux véhicules ont été retenus. Dans un deuxième temps, nous avons examiné quelles variables nous pouvions identifier parmi les facteurs externes présentés ci-bas. Ces variables sont les suivantes :

ACCIDENTS-OCCUPANTS HOMOGÈNES

Variables suggérées	Variables utilisées (X)
	Recherche U. de M.
1 - décélération (Δv)	1 - premier niveau d'homogénéisation et indicateur = zone de vitesse autorisée
2 - temps de décélération (γ_{moyen})	2 -
3 - poids des véhicules	3 - X
4 - région de l'impact	4 - X (2 véhicules)
5 - intrusion	5 -
6 - genre d'impact	6 - X (1 véhicule)
7 - fonction de l'occupant, i.e. sa position dans le véhicule	7 X
8 - âge	8 - X
9 - sexe	9 - X
10 - poids de l'occupant	10 - X (taille)

Comme on peut le constater, nous contrôlons plusieurs variables confondantes. Toutefois, les deux premières, qui nous permettraient de juger de la gravité de l'impact des accidents, font défaut dans notre source de données. Il est impossible d'obtenir ces variables à moins d'une investigation en profondeur sur le site de chaque accident par une équipe d'ingénieurs, médecins, techniciens, etc. L'indice dont nous avons tenu compte concernant la force d'impact est la variable "zone de vitesse autorisée". C'est un indicateur grossier, certes, mais il permet de différencier deux groupes selon les zones de vitesse.

La création des groupes d'accidents-occupants-homogènes a donc été effectuée en tenant compte des quatre facteurs suivants :

- la zone de vitesse autorisée (2 classes)
- la masse des véhicules (4 classes)
- accidents à 2 véhicules : région d'impact (5 classes)
- accidents à 1 véhicule : genre d'accident (3 classes)
- la fonction de l'occupant (2 classes : conducteur et passager avant).

Notre population d'analyse ne concerne donc que les occupants avant des véhicules accidentés. La ventilation des données selon les diverses classes de ces quatre facteurs a permis de constituer 192 groupes. Parmi ces groupes d'accidents similaires, nous avons retenu 53 groupes parmi les plus populeux. Une cueillette de données au dossier manuscrit de chaque réclamant a été entreprise sur l'échantillon final afin de préciser le diagnostic des blessures et de vérifier d'autres variables en fonction du croquis d'accident fait par le policier. Notre échantillon comprend donc 11 groupes d'occupants impliqués dans des accidents à un véhicule et 42 groupes d'occupants dans des accidents à deux véhicules. Ces occupants se répartissent comme suit :

Tableau 1. Répartition des victimes d'accidents retenues dans l'échantillon selon le type d'accident et le port de la ceinture, occupants avant. Québec, 1978-1981.

Genre d'accident \ Port de la ceinture	Ceinturés	Non ceinturés	Total
Accidents à 2 véhicules	7 886	3 827	11 713
Accidents à 1 véhicule	554	580	1 134
Total	8 440	4 407	12 847

Soulignons que les individus pour lesquels le port de la ceinture de sécurité est non précisé au rapport de police ont été exclus, ce qui entraîne une perte de sujets d'environ 13%. Toutefois, cette perte de sujets n'entraîne pas de biais systématique sur l'échantillon retenu puisque, après vérification, il est apparu que ces individus se distribuaient de façon aléatoire selon l'âge, le sexe ou le groupe d'accidents-occupants homogènes. De plus, notre échantillon compte pour environ 8% des accidents avec dommages corporels survenus au Québec durant la période considérée. Il n'est cependant pas représentatif de l'ensemble. Il concerne une part précise et bien identifiée de cet ensemble.

GRAVITÉ DES BLESSURES

Dans une étude portant sur le rendement de la ceinture de sécurité, il est essentiel de pouvoir quantifier la gravité des blessures subies par les occupants puisque l'efficacité de la ceinture est obtenue par la comparaison des blessures subies par les ceinturés et les non-ceinturés.

Dans notre étude, chacun des diagnostics de blessures relevés dans le dossier des réclamants a été codifié selon l'échelle de sévérité des lésions (Abbreviated Injury Scale - version 1980). Cette échelle comporte six niveaux de 1 à 6. Par extension, la cote "0" est attribuée aux personnes n'ayant pas de blessures apparentes. Pour les besoins de notre étude, nous attribuons également la cote "0" aux personnes non-réclamantes auprès de la Régie de l'assurance automobile, puisque selon toute vraisemblance elles n'ont pas subi de blessures ou très peu, bien qu'elles aient été impliquées dans un accident où il y eut au moins un réclamant.

L'échelle A.I.S. accorde une cote à chacune des blessures subies par un occupant. Ainsi, un occupant ayant subi des blessures multiples aura plusieurs valeurs A.I.S. pour le caractériser. Cependant, dans une perspective de comparaison, il est nécessaire d'avoir une seule mesure par individu. Nous avons donc choisi de retenir le M.A.I.S. (Major Abbreviated Injury Scale) qui est la cote A.I.S. attribuée à la blessure la plus grave subie par un individu. Nous avons aussi utilisé la classification I.S.S. (Injury Severity Score) qui donne une cote par victime et tient compte d'un plus grand nombre de blessures et régions blessées. Ces résultats ne sont pas présentés ici.

INDICE D'EFFICACITÉ DE LA CEINTURE

Nos résultats seront présentés au moyen d'un indice que nous appelons "indice d'efficacité de la ceinture". Cet indice, qui est le négatif de la fraction attribuable fréquemment utilisée en épidémiologie, se calcule selon la formule suivante :

$$\text{indice d'efficacité du système de retenue (\%)} = \left[\left(\frac{\text{parmi les ceinturés, proportion ayant un niveau A.I.S. donné (x)}}{\text{parmi les non-ceinturés, proportion ayant ce même niveau A.I.S. (x)}}\right)\right]-1 \times 100$$

Cet indice indique le pourcentage d'augmentation ou de diminution qu'aurait subi la proportion de non-ceinturés d'un niveau A.I.S. donné si toutes ces personnes avaient porté leur ceinture. En d'autres mots, l'interprétation des indices en regard de l'efficacité de la ceinture s'effectue comme suit : plus le résultat négatif est important pour les niveaux A.I.S. élevés (3-4-5-6 principalement) et/ou plus le résultat positif est important pour le plus bas niveau A.I.S. (0), plus le système de retenue est efficace.

RÉSULTATS ET DISCUSSION

Les résultats sont présentés d'abord pour les occupants victimes d'accidents à deux véhicules et ensuite pour ceux impliqués dans les accidents à un véhicule.

A - Victimes d'accidents à deux véhicules

Examinons d'abord les accidentés de collision à deux véhicules. Le tableau 2 présente la répartition des occupants selon la gravité de leurs blessures.

Tableau 2. Répartition des victimes (%) selon
la gravité de leurs blessures
- 2 véhicules -

M.A.I.S.	0	1-2	3-4-5	6	TOTAL (effectif)
ENSEMBLE [1]					
Ceinturés	67,1	29,9	2,6	0,4	100 (7886)
Non ceinturés	62,5	32,0	4,2	1,3	100 (3827)
CONDUCTEURS [2]					
Ceinturés	68,5	28,8	2,3	0,4	100 (5372)
Non ceinturés	63,8	30,4	4,1	1,6	100 (2267)
PASSAGERS AVANT [3]					
Ceinturés	64,2	32,2	3,3	0,4	100 (2514)
Non ceinturés	60,6	34,2	4,2	1,0	100 (1560)

[1] $\chi^2_{(3)} = 67{,}61,\ p < 0{,}001$

[2] $\chi^2_{(3)} = 57{,}78,\ p < 0{,}001$

[3] $\chi^2_{(3)} = 11{,}59,\ p < 0{,}010$

On remarque d'abord que, dans l'ensemble (conducteurs + passagers), la proportion d'indemnes est très élevée, autour de 65%. On constate aussi qu'il y a peu de différence entre conducteurs et passagers avant quant à la répartition des occupants selon la gravité de leurs blessures. Les ceinturés sont moins nombreux à avoir subi des blessures que les non-ceinturés, que ce soit pour l'ensemble, pour les conducteurs ou pour les passagers avant. La ceinture de sécurité apparaît donc efficace.

C'est ce que montrent d'ailleurs les indices d'efficacité calculés à partir de ces données (tableau 3).

Le tableau 3 montre, de façon plus directe, l'effet qu'aurait le port de la ceinture sur les proportions de non ceinturés. Ainsi, pour l'ensemble, il y aurait, chez les non-ceinturés, une diminution de 69% de la porportion de tués s'ils portaient leur ceinture. La proportion de blessés graves diminuerait de 38% et celle des blessés mineurs de 6,6%. Parallèlement, la proportion d'indemnes serait augmentée de 7,4%. De plus, le port de la ceinture profiterait plus aux conducteurs qu'aux passagers avant.

Afin de donner une vision plus pragmatique de ces résultats, on a calculé ce que donnerait le port de la ceinture sur la répartition des 3827 individus non ceinturés (tableau 4).

Tableau 3. Indice d'efficacité de la ceinture (%)
- 2 véhicules -

M.A.I.S.	0	1-2	3-4-5	6
Ensemble	+7,4	-6,6	-38,1	-69,2
Conducteurs	+7,4	-5,3	-43,9	-75,0
Passagers avant	+5,9	-5,8	-21,4	-60,0

Tableau 4. Effet potentiel du port de la ceinture chez les non ceinturés
- 2 véhicules -
(conducteurs et passagers avant)

M.A.I.S.	0	1-2	3-4-5	6	TOTAL
Effectif observé	2392	1224	160	51	3827
Effectif potentiel	2568	1144	100	15	3827
Différence	+176	-80	-60	-36	0

Au tableau 4, on a d'abord l'effectif des non-ceinturés répartis selon la gravité de leurs blessures tel qu'il a été observé (tableau 2). Nous présentons ensuite l'effectif potentiel de non-ceinturés si ces personnes avaient porté leur ceinture (i.e. la répartition des non-ceinturés selon la gravité des blessures observée chez les ceinturés). La différence entre ces deux effectifs nous donne l'efficacité de la ceinture. Ainsi, si les 3827 non-ceinturés avaient porté leur ceinture, 36 personnes auraient évité la mort, 60 personnes de moins auraient subi des blessures graves, 80 personnes de moins auraient eu des blessures mineures et, enfin, 176 personnes de plus auraient été indemnes. Ces résultats que nous obtenons à partir de données québécoises corroborent ceux obtenus par d'autres groupes de chercheurs. Nous présentons au tableau 5 les résultats de trois études effectuées à partir d'investigation en profondeur.

On constate alors que, dans ces études comme dans la nôtre, le port de la ceinture de sécurité permettrait un glissement de la gravité des blessures vers des niveaux de gravité moindre. Ces études montrent une réduction importante des tués et de blessés graves, une réduction légère des blessés mineurs et une augmentation très importante des indemnes. Les résultats obtenus par ces chercheurs vont donc dans le même sens que ceux que nous obtenons pour le Québec. Les niveaux d'efficacité sont proches pour ce qui est des tués et des blessés. Par contre, grâce au port de la ceinture, ils obtiennent une augmentation potentielle des indemnes nettement supérieure à nos résultats (environ 90% comparé à 7%).

Tableau 5. Indice d'efficacité (%) de la ceinture de sécurité selon la fonction de l'occupant et la gravité des blessures, tous types d'impact.

A.I.S. (Abbreviated Injury Scale)	Source[1]		FONCTION		NOMBRE DE SUJETS (ceinturés + non ceinturés)
		Conducteur	Passager avant	tout occupant	
0	a			114,5	1 757
	b	88,8	91,2	88,5	1 494
	c	82,4	117,9	91,6	1 135
1-2	a			- 16,2	4 361
	b	- 5,5	- 3,9	- 4,7	3 735
	c	-12,9	- 10,4	- 11,8	2 932
3-4-5	a			- 35,6	736
	b	-40,7	- 28,0	- 36,4	995
	c	-41,9	- 36,4	- 40,5	507
6	a			- 61,6	398
	b	-63,5	- 72,4	- 66,7	551
	c	-52,8	- 68,1	- 57,7	277

[1] Source : Laberge-Nadeau et al., 1986, tableau B-1, p. 10.
Note : Ces indices proviennent de calculs effectués à partir des proportions ou des résultats bruts présentés dans les études suivantes :
a - Harteman et al (1984), tableau 3 - Overall-A.I.S.
b - Cesari et al. (1981), tableau 2 - non précisé
c - Thomas et al. (1980), tableau 3 - Overall-A.I.S.

Cette disparité s'explique, en partie du moins, par la gravité globale de leurs échantillons vis-à-vis du nôtre. Chez ces auteurs il s'agit d'accidents investigués en profondeur, donc d'accidents suffisamment graves pour envoyer des enquêteurs sur place, ce qui n'est pas notre cas. Ainsi, la proportion d'indemnes est de 25% environ dans les études citées alors qu'elle est de 65% dans la nôtre. Et l'indice que nous utilisons est sensible à ce niveau de gravité global. En effet, plus les proportions sont petites dans une catégorie donnée, plus l'indice est sensible aux variations de ces proportions. Ce phénomène a déjà été discuté d'ailleurs par certains auteurs (Campbell and Reinfurt; 1979). Aussi, avec des proportions d'indemnes de 25% comparativement à notre 65%, il n'est pas étonnant de trouver dans ces études un indice d'efficacité de la ceinture pour les indemnes nettement supérieur à ce que nous avons obtenu.

Suite à ces résultats d'ensemble pour les accidents à deux véhicules, nous présentons maintenant quelques résultats globaux en ce qui a trait à la masse des véhicules, à la zone de vitesse autorisée et au type d'impact. Examinons d'abord l'efficacité de la ceinture en fonction de la masse des véhicules, plus précisément l'efficacité de la ceinture selon que l'occupant prenne place dans le véhicule le plus léger ou le plus lourd lors d'une collision impliquant deux véhicules de masse différente. Au tableau 6, les indices d'efficacité montrent que pour les indemnes et pour les blessés mineurs, les occupants du véhicule léger seraient plus avantagés par le port de la ceinture de sécurité que ceux du véhicule plus lourd. Par contre, il semblerait que les occupants du véhicule le plus lourd bénéficieraient d'une réduction plus grande des blessés graves et des morts. Mais cette constatation est artificielle et liée à notre indice. Car si nous calculons l'effet potentiel de la ceinture sur ces deux groupes comme on l'a fait précédemment, on obtient les résultats présentés au tableau 7.

Ainsi, parmi les occupants non ceinturés du véhicules le plus lourd, 45 personnes bénéficieraient du glissement de la gravité de leurs blessures blessures vers des niveaux de gravité moindre grâce au port de la ceinture alors que, parmi les occupants non ceinturés du véhicule léger, 144 personnes connaîtraient cet avantage. Et par rapport aux effectifs non ceinturés de ces deux groupes, on peut voir que seulement 2,8% des non-ceinturés occupant un véhicule lourd profiteraient du port de la ceinture contre 8,9% des non-ceinturés occupant le véhicule léger.

Tableau 6. Indice d'efficacité de la ceinture (%) selon l'occupation du véhicule le plus lourd ou le plus léger.
- 2 véhicules -
(conducteurs et passagers)

M.A.I.S.	0	1-2	3-4-5	6
Véhicule lourd [1]	+ 3,8	- 1,8	-48,5	-77,8
Véhicule léger [2]	+18,2	-12,2	-37,9	-66,7

[1] $\chi^2_{(3)} = 29,84$, $p < 0,001$

[2] $\chi^2_{(3)} = 54,37$, $p < 0,001$

Note : Dans ce tableau et dans les suivants qui présentent des indices d'efficacité, le test du χ^2 s'applique à la répartition des victimes ceinturées et non ceinturées selon la gravité de leurs blessures à partir de laquelle ont été calculés les indices d'efficacité correspondants.

Tableau 7. Effet potentiel du port de la ceinture chez les non-ceinturés selon l'occupation du véhicule le plus lourd ou le plus léger.
- 2 véhicules -
(conducteurs et passagers)

M.A.I.S.	0	1-2	3-4-5	6	Proportion de non-ceinturés qui profiteraient du port de la ceinture
Véhicule lourd	+ 45	- 7	-26	-12	45/1609 = 2,8%
Véhicule léger	+144	-86	-35	-23	144/1624 = 8,9%

L'efficacité de la ceinture est donc plus marquée chez les occupants du véhicule léger que chez ceux du véhicule lourd dans une collision impliquant deux véhicules de masse différente. Et cette efficacité plus grande de la ceinture pour les occupants du véhicule léger est liée au fait que, dans nos données, ils sont dans l'ensemble plus gravement blessés que les occupants du véhicule lourd, que les occupants soient ceinturés ou non. Cette surreprésentation des blessés chez les occupants de véhicule léger a été montrée précédemment par les études de Evans (1985).

Tableau 8. Indice d'efficacité de la ceinture (%) chez les les victimes d'accidents en zone de haute vitesse (50-120km/h).
- 2 véhicules (conducteurs) -

M.A.I.S.	0	1-2	3-4-5	6
Ensemble[1]	+17,0	- 2,5	-43,0	-73,8
• collision frontale[2]	+16,9	+12,7	-15,7	-77,6
• collision latérale[3]	+22,3	-14,3	-54,1	-68,8

[1] $\chi^2_{(3)} = 34,66,\ p < 0,001$

[2] $\chi^2_{(3)} = 17,30,\ p < 0,001$

[3] $\chi^2_{(3)} = 14,98,\ p < 0,005$

Ainsi, plus un groupe d'accidentés est blessé gravement dans l'ensemble, plus la ceinture de sécurité trouve de candidats potentiels à protéger. Et donc, plus elle apparaît efficace.

On a examiné aussi l'efficacité de la ceinture selon la zone de vitesse autorisée. Pour la zone de haute vitesse (50 km et plus), on note un rendement élevé de la ceinture de sécurité. Ainsi, on observerait une diminution de 74% de la proportion de tués chez les non-ceinturés s'ils avaient porté leur ceinture. Les proportions de blessés graves et mineurs diminueraient aussi alors que la proportion d'indemnes augmenterait de façon substantielle, de 17%. On observe aussi pour deux types d'impact identifiés en zone de haute vitesse, les collisions frontales et les collisions latérales, que le rendement de la ceinture est élevé. En fait, l'efficacité de la ceinture est à peu près équivalente dans ces deux groupes.

Tableau 9. Indice d'efficacité de la ceinture (%) chez les victimes d'accidents en zone de basse vitesse (moins de 50km/h).
- 2 véhicules (conducteurs) -

M.A.I.S.	0	1-2	3-4-5-6
Ensemble[1]	+5,2	-6,0	-50,0
• collision latérale, frontale[2]	+5,0	-4,7	-48,7
• collision latérale, sens inverse[3]	+13,3	-19,9	-47,2

[1] $\chi^2_{(2)} = 18,45,\ p < 0,001$

[2] $\chi^2_{(2)} = 13,19,\ p < 0,005$

[3] $\chi^2_{(2)} = 8,31,\ p < 0,025$

Pour les accidents survenant en zone de basse vitesse (tableau 9), soit à moins de 50 km/h, on note un rendement de la ceinture inférieur à celui constaté en zone de haute vitesse. Toutefois, ici encore, l'effet de la ceinture de sécurité est positif puisque la proportion de tués et de blessés graves aurait pu être diminuée de moitié.

Au tableau 9, on voit aussi que les victimes impliquées dans une collision latérale avec véhicules venant en sens inverse profitent plus du port de la ceinture que les victimes de collision latérale frontale.

B - Victimes d'accidents à un véhicule

Examinons maintenant l'efficacité de la ceinture pour les victimes d'accidents impliquant un seul véhicule (tableau 10)

Tableau 10. Indice d'efficacité de la ceinture (%) et répartition (%) des victimes selon la gravité de leurs blessures.
- 1 véhicule -
(conducteurs et passagers avant)

M.A.I.S.	0	1-2	3-4-5	6
Indice (%)	+15,4	+9,9	-45,8	-65,9
Répartition (%)[1]				
Ceinturés (n=554)	39,0	51,3	8,3	1,4
Non ceinturés (n=580)	33,8	46,7	15,3	4,1

[1] $\chi^2_{(3)} = 22,38$, $p < 0,001$

On constate alors que, chez les victimes d'accidents à un véhicule, la proportion de tués serait réduite de 66% grâce au port de la ceinture, celle des blessés graves de moitié, alors que les proportions d'indemnes et de blessés mineurs augmenteraient. En outre, le rendement de la ceinture de sécurité est plus marqué chez les victimes d'accident à un véhicule que chez les victimes d'accident à deux véhicules, entre autres parce que la population des occupants d'accidents à un véhicule est plus gravement blessée puisqu'on trouve seulement 36% d'indemnes dans ces groupes contre 65% chez les occupants d'accidents à deux véhicules. Chez les victimes de capotage, on observe au tableau 11 que le port de la ceinture de sécurité est une mesure de protection très efficace. En effet, grâce au port de la ceinture, on observerait un glissement important de la gravité des blessures vers des niveaux de gravité moindre : réduction de 82% des morts, de 43% des blessés graves et augmentation de 28% des indemnes.

C - Groupes d'accidents-occupants homogènes

Il serait trop long ici de présenter les résultats obtenus pour chacun des groupes d'accidents-occupants-homogènes. Disons seulement que, chez les groupes pour lesquels on a trouvé des différences significatives entre ceinturés et non-ceinturés, les résultats obtenus vont dans le même sens que les résultats globaux qui ont été présentés plus tôt — à savoir que la ceinture de sécurité est efficace pour réduire la gravité des blessures.

De plus, parmi les groupes qui ne montrent pas de différences significatives entre ceinturés et non-ceinturés, on trouve entre autres tous les groupes d'occupants impliqués dans les collisions arrière. Dans la dynamique de ce type d'impact, le siège joue un rôle protecteur. Notre résultat corrobore celui trouvé par Shiels et Watson (1975) et par Rutherford et al. (1985).

Tableau 11. Indice d'efficacité de la ceinture (%) chez les victimes de capotage.
- 1 véhicule -
(conducteurs et passagers)

M.A.I.S.	0	1-2	3-4-5	6
Indice (%)	+28,1	+ 8,8	-43,2	-81,5

Note : $\chi^2_{(3)} = 24{,}28$, $p < 0{,}001$

Étude de Huelke (1977)

O.A.I.S.	0	1-2	3-4-5	6
Indice (%)	+55	+38	-51	-91

Nos résultats sont comparables avec ceux de l'étude de Huelke sur les capotages bien qu'on y trouve des niveaux d'efficacité supérieurs aux nôtres.

CONCLUSION

Ainsi, notre recherche montre que la ceinture de sécurité est efficace. Elle montre aussi qu'il y a moyen d'utiliser les données valables de la Régie de l'assurance automobile du Québec pour des fins d'évaluation d'impact, grâce à leur collaboration et à l'organisation de leurs fichiers qu'il faut continuer à améliorer.

Enfin, selon nos résultats, pour l'ensemble des victimes impliquées dans des accidents à un et à deux véhicules, le port de la ceinture réduirait de 77% la proportion de tués parmi les non-ceinturés, diminuerait de 47% la proportion de blessés graves et augmenterait la proportion d'indemnes de 11%. Dans une perspective de santé publique, ces résultats sont importants. Et comme ce moyen de prévention — le port de la ceinture de sécurité — est à la portée de tous, il faudrait trouver des moyens de convaincre toute la population "de la boucler!", comme le disait si bien une publicité connue.

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INSURANCE CORPORATION OF BRITISH COLUMBIA

COMMENTS ON MOTOR VEHICLE OCCUPANT PROTECTION IN CANADA

Transport Canada Public Forum
March, 1987.

BACKGROUND

The Insurance Corporation of British Columbia is Canada's largest automobile insurer with over 2 million policyholders. In 1986, the Corporation handled approximately 540,000 claims costing a total of $724 million.

This extensive day to day involvement in dealing with the results of automobile accidents provides some valuable insight into the question of occupant injuries and protection.

In addition to our experience in handling insurance claims, the Corporation has several specialized departments with a more direct involvement in occupant protection:

A Traffic Safety Education program was introduced in 1981. Five years later, the program is widely regarded as a model for safety education in North America. It is a program that requires substantial commitment and expenditures of more than $3 million a year, but the returns are equally substantial. For example, the rate of seat belt use in British Columbia increased from 58 percent in 1981 to 75 percent in 1986. This was due largely to a campaign led by ICBC.

The Corporation's Material Damage Training and Research department has worked with various passive restraint systems for a dual purpose: education of the public in the operation of such devices, and training of the repair industry in the procedures and skills required to repair these systems following an accident.

Part of this research has been the retrofitting of a vehicle with a driver's side air bag, and a passenger side three point automatic seat belt.

The results of what we have learned through these various activities form the basis of our comments. We are in the unique position of having experience in motor vehicle injuries and occupant protection from direct involvement in hundreds of thousands of accidents each year. At the same time, we do not represent any special interest group or manufacturer and can offer unbiased information.

A great deal of emphasis in the question of occupant restraints is placed on the projected cost effectiveness of various systems. It is well understood by the Insurance Corporation of B.C. that the true cost of catastrophic injuries or fatalities cannot be measured in dollars alone, and that a cost benefit analysis cannot justify failure to employ available safety systems that could save hundreds of thousands of serious injuries and deaths.

Regardless of our feelings on this issue, however, if a cost effectiveness analysis is to be considered, we would like to propose the following:

(i) **BENEFIT OF INJURIES/FATALITIES PREVENTED**

The Transport Canada background paper on occupant restraints points to a financial benefit of $3,000 for an injury prevented and $260,000 for a fatality avoided, based on a 1980 study. In terms of insurance payments alone, however, current experience shows that by the end of 1986, these figures have been greatly exceeded.

The most serious type of injuries are the ones which are best addressed by occupant restraint systems.

Serious head injuries involving brain damage to drivers and passengers most often result from unrestrained occupants striking the roof rail or windshield pillar. There are currently 172 open claims of this nature in B.C. with an average cost of well over $500,000.

Spinal injuries involving paralysis are most commonly the result of ejection of unrestrained occupants. In B.C. there are currently 76 active paralysis claims for drivers and passengers with an average cost of just under $500,000.

The overall average cost of a bodily injury (including fatal) in B.C. during 1986 was almost $15,000. This does not include the additional cost of accident benefit and death benefit payments from automobile policies or other insurance available. This cost is in no way hypothetical or theoretical, but represents actual payments, the cost of which is directly borne by the motorist through insurance premiums.

If a minimal average cost of $15,000 per injury is used to recalculate the cost effectiveness of restraint systems, the break even point on advanced systems could be significantly changed.

(ii) COST OF AUTOMATIC BELT SYSTEMS

Discussions with various auto manufacturers and our own experience with construction of passive restraint systems leads us to a different conclusion than that reached in the background paper regarding the future cost of automatic belt systems.

The additional cost to provide an automatic belt system in current vehicle lines is calculated as $80 per vehicle. This calculation is no doubt sound on current vehicles, but will change as domestic production changes to comply with U.S. passive restraint requirements. If automatic belt systems are not used in Canada in future years, North American manufacturers will be faced with costly double tooling in order to provide different restraint systems for the relatively smaller Canadian market. This means that active belt systems will have no cost advantage over passive belt systems on vehicles that are equipped with passive belts for U.S. production.

This factor may change the break even point of some occupant restraint systems.

(iii) ACTIVE BELT USAGE RATES

Much of the relative benefit of passive restraints depends on the anticipated rate of use of active belts. If one anticipates future belt use rates to remain low as they are in the U.S., or in provinces without mandatory belt use laws, then passive restraints make good economic sense. If one anticipates belt usage rates of 90% or 95% then very little additional benefit may result from passive restraints.

The Insurance Corporation has been active in leading B.C. to the highest belt use rate in Canada and we are very aware of the amount of effort required by police, education and safety groups to attain various rates of seat belt use.

The results of our experience would suggest that a realistic goal for sustained seat belt use rates throughout Canada is 70%-75% assuming all provinces adopt and enforce legislation and provide the necessary public education and backup systems.

We would suggest this ultimate goal of 70%-75% belt use rates be used for projected comparison of active belts to other systems.

(iv) REPAIR COST

One item that affects the overall cost of restraint systems is their after collision repair cost. Following impacts at speeds of 25 k.p.h. or greater (the speed at which most airbags deploy), approximately 50% of cars are total losses, while the other 50% are repairable. Occupant restraint system repair cost therefore becomes a factor in half the impacts at such speeds, and that cost can be considerable.

The parts alone to restore the Supplementary Restraint System in a Mercedes-Benz following deployment (one airbag module and two seat belt tensioners) exceeds $2150, much of which is taxes and duties. The Ford Tempo air bag, while much less expensive, is still not cheap. The air bag module cost is $392.43 U.S. The price rises with exchange, exise tax, federal and provincial sales tax to $685.57 in B.C.

Some 1988 G.M. products will have "energy management loop" seat belts which require replacement following even moderate impacts. Parts and labour to restore two front seat belts will easily exceed $400.

If the cost of restoring these systems following an impact is excessive, vehicle owners and repairers will be tempted to delay or omit such repairs. As much of the cost of the parts required to restore these safety systems is in the form of federal taxes and duties, we would ask the federal government to consider exemption of occupant restraint repair parts from such taxes in order to encourage individuals to properly repair and maintain these systems.

CAA QUEBEC

2800, boul. Laurier
C.P. 9600, Ste-Foy
Québec, G1V 4K8
Tél.: (418) 653-2600
Télex: 051-31745

1180, rue Drummond
Suite 100, Montreal
Quebec, H3G 2R7
Tél.: (514) 861-7111
Télex: 052-5791

- Anjou
- Brossard
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- Dollard des Ormeaux
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- Laval
- Sherbrooke
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PRÉSENTATION DU CAA-QUÉBEC AU FORUM PUBLIC SUR LES SYSTÈMES DE RETENUE DES OCCUPANTS DES VÉHICULES AUTOMOBILES

TENU À OTTAWA LES 25 ET 26 MARS 1987

Le CAA-Québec, organisme sans but lucratif regroupant plus de 360 000 membres, travaille activement depuis de nombreuses années afin de promouvoir l'utilisation de la ceinture de sécurité et les autres dispositifs de retenue.

La ceinture de sécurité constitue la première ligne de défense en cas d'accident. Paradoxalement, cet équipement de sécurité n'est couvert, à quelques exceptions près, que par la garantie de base des fabricants de 12 mois ou 20 000 kilomètres.

Les occupants d'un véhicule automobile doivent pouvoir compter sur leur ceinture de sécurité en tout temps. Pour cette raison, le CAA-Québec recommande aux fabricants de garantir pour la durée de vie du véhicule les dispositifs de retenue faisant partie de l'équipement d'origine.

De plus, il est important que ces dispositifs soient inspectés sur une base régulière. Le CAA-Québec recommande alors aux fabricants d'inclure l'inspection des ceintures de sécurité dans leur calendrier d'entretien régulier.

Toutefois, un autre point important reste à souligner: Une collision, même mineure, peut parfois entraver le fonctionnement normal du mécanisme des ceintures. Le CAA-Québec recommande donc à tous les intervenants dans le processus d'évaluation de dommages causés par un accident de porter une attention toute particulière aux ceintures de sécurité afin que ces dernières soient remplacées au besoin.

Le CAA-Québec demeure convaincu de l'intérêt très vif de tous les intervenants pour la sécurité des usagers de la route. Nous souhaiterions qu'avec la collaboration de tous, nos recommandations puissent être mises en application dans les plus brefs délais.

LE COMITÉ DE LA SÉCURITÉ ROUTIÈRE DU CAA-QUÉBEC

CAA
Communiqué

FOR IMMEDIATE RELEASE

SEAT BELT INSPECTIONS NECESSARY

March 20, 1987 -- Seat belts are the first line of defense in an accident but CAA-Quebec warns motorists seat belts could become unusable.

It is important that seat belts be inspected regularly to make sure they are working properly. CAA-Quebec therefore wants auto manufacturers to include seat belt inspections in their regular maintenance schedules and strongly recommends that seat belts be covered by the manufacturer's basic warranty for the life of the vehicle.

In addition, says CAA-Quebec, seat belts must be systematically inspected following any accident and replaced when required. The automobile club urges all those involved in the evaluation of accident damages to pay particular attention to seat belts.

CAA-Quebec, a not-for profit organization with over 355,000 members, has been active for many years in promoting the use of seat belts and other safety equipment.

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For more information, please contact:

Public Affairs Bureau
CAA-Quebec
(418) 653-2600

Public Affairs Bureau
CAA-Quebec
(514) 465-7770

Preamble March 26th, 1987

I'm Shirley Post, Executive Director of the Canadian Institute of Child Health. Dr. Barry Pless, Chairman of the Board is sorry that he is unable to be here today. However he has asked me to read the C.I.C.H. position statement into the record of todays meeting.

Dr. Pless himself has researched and published a number of papers related to child restraint systems and their use. In fact his latest publication "The Epidemiology of Road Accidents in Childhood" by Pless et al., appeared in the March 87 issue of the American Journal of Public Health.

Over the last ten years the Institute has also had an Injury Prevention Program because more children and youth die from injuries in Canada every year than from any other cause. We have been actively involved with lobbying the provincial governments for seat restraint legislation for infants and children and we are pleased with the fact that almost all provinces now have legislation in place. We also commend Transport Canada for the progress that is being made to get manufacturers to voluntarily provide tether anchorages.

However we would like to bring to the attention of this government that if child passengers are going to be protected a more global approach is needed that must also involve the Justice Department as well as the Department of Transport.

Canadian Institute of Child Health

Suite 105, 17 York Street
Ottawa, Ontario K1N 5S7
Canada
(613) 238-8425

Institut canadien de la santé infantile

Suite 105, 17, rue York
Ottawa (Ontario) K1N 5S7
Canada
(613) 238-8425

C.I.C.H. Position Statement on Infant and Children Car Occupant Restraints and the Enforcement of Legislation, "Dangerous Driving" Offences, the Age of Licensing and the Drinking Age

On behalf of the Canadian Institute of Child Health I wish to bring to the attention of this inquiry two facts regarding passenger protection that bear emphasis. The first is that as an Institute we feel that legislation for child safety has, historically, taken second place to concern for adult safety, and that child safety continues to take second place with respect to enforcement. In general, it seems pointless to have legislation which is neither vigorously enforced, nor, when enforced, punished by measures which are hardly incentives for change. We would prefer to follow the practice in some American constituencies and have child seats issued by highway patrols when none are in use and required. However, the issue extends beyond infant to all child passengers who need protection. Hence we urge that Transport Canada take a strong position and increase pressure on both federal and provincial governments to ensure that such enforcement is maintained on a regular basis, and not simply during periods of crackdowns.

Occupant protection is achieved through restraint use as a method of "secondary protection", that is, to help prevent injuries following a crash. Much preferable is primary prevention, through which crashes are avoided in the first place. We are convinced that this will improve if there is a more aggressive and consistent attitude toward dangerous driving offences across the provinces. This includes not only alcohol related offences but other forms of dangerous driving as well. It has come to our attention that individual provinces and municipalities apply and interpret the criteria for what constitutes a "dangerous driving offence" differently. In view of the fact that this falls within the criminal code of Canada, steps must be taken to ensure that the Justice Department rectifies this situation.

Finally, also in the spirit of promoting primary prevention, we wish to call the attention of Transport Canada to the benefits we believe will follow if, nationally, the age of licensing and the drinking age are revised upwards to age 18 years. Much evidence exists to support this move and we strongly urge you to press the provincial departments of transport, and justice departments, to move promptly in this direction.

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